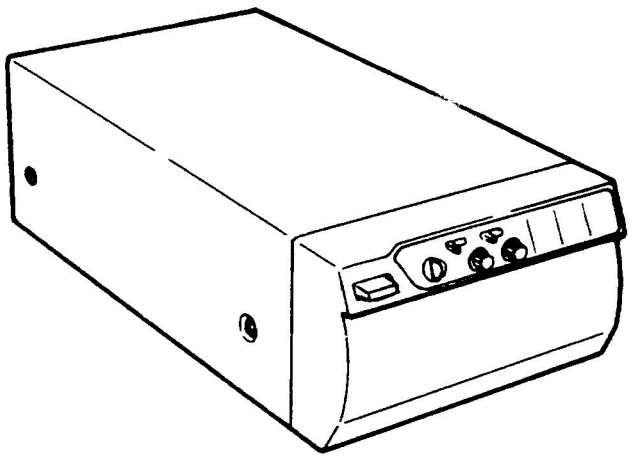
SONY

VIDEO GRAPHIC PRINTER

UP-890CE
UP-890MD

SERVICE MANUAL



SAFETY RELATED COMPONENT WARNING

Components identified by shading and ⚠ marked on the schematic diagrams and parts list are critical to safe operation. Replace these components with SONY parts whose part numbers appear as shown in this manual or in supplements published by SONY.

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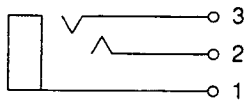
SECTION 1
GENERAL

This section is extracted from instruction manual.

1-1. SPECIFICATIONS

Thermal head
  Thin-film thermal head (with built-in drive IC) 1024-dot drive
Gradation
  256
Resolution (in WIDE 1 mode)
  EIA: 970 x 490 dots
  CCIR: 970 x 582 dots
Print size (in NORM and WIDE 1 mode)
  STD mode
    EIA: 95 x 72 mm
    CCIR: 95 x 71 mm
  SIDE mode
    EIA: 127 x 96 mm
    CCIR: 127 x 95 mm
Printing speed (in STD and NORM mode)
  About 3.9 seconds/screen (aspect ratio 4:3)
Picture memory
  786 K x 6 bits
Input/output connectors
  VIDEO IN (BNC)
    EIA or CCIR
    Composite video signals
    1.0 Vp-p, 75 ohms/high-impedance (EIA/CCIR automatically discriminated)
  VIDEO OUT (BNC)
    EIA or CCIR
    Composite video signals
    1.0 Vp-p, 75 ohms, loop-through/EE switchable
  REMOTE (stereo minijack)



1 GND
2 PRINT SIGNAL (TTL)
  Input of LOW pulse over 100 msec. initiates print.
3 PRINT BUSY (TTL)
  Goes HIGH during printing.

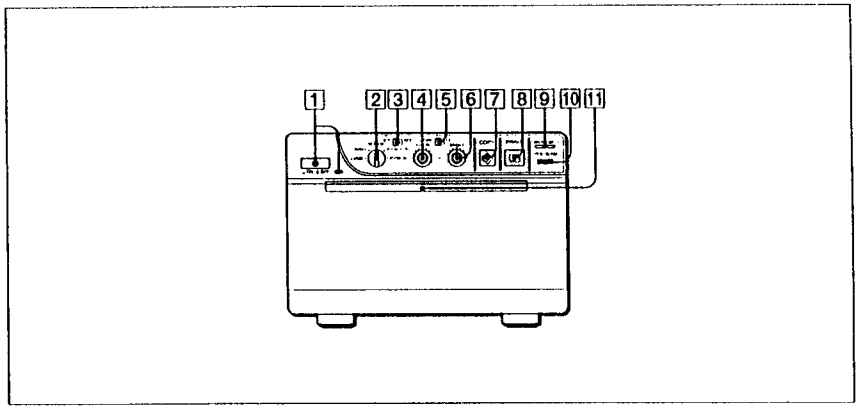
Power requirements and consumption
  120 V AC, 50/60 Hz, 1.5 A (UP-890MD)
  220 to 240 V AC, 50/60 Hz, 0.8 A (UP-890CE)
Dimensions
  Approx. 154 x 106 x 303 mm (w/h/d) (6⅛ x 4¼ x 12 inches)
Mass
  Approx. 3.5 kg (7 lb 11 oz), Main unit only
Supplied accessories
  Paper roll (UPP-110HA) (1)
  BNC – BNC connecting cable (1)
  AC power cord (1)
  Head cleaning sheet (1)
  Remote commander RM-91 (1) supplied with UP-890MD only

Design and specifications are subject to change without notice.

1-2. LOCATION AND FUNCTION OF PARTS

For details, refer to the pages indicated in parentheses.

Front



1 Power ON/OFF switch and indicator
Turns the power on. The indicator is lit while the power is on.

2 Printing size selector (13)
Selects the printing size.

3 STD (standard)/SIDE selector (13)
Selects the printing direction.

4 CONTR (contrast) control (15)
Adjusts the contrast of the print-outs.

5 THRU/EE selector (15)
Selects the video signal output from the VIDEO OUT connector.
THRU: Input signals are directly output to the video monitor.
EE: Input signals are output to the video monitor after being processed by the printer's circuitry.

6 BRIGHT (brightness) control (15)
Adjusts the brightness of the print-outs.

7 COPY button (14)
Prints another copy of the previous print-out.

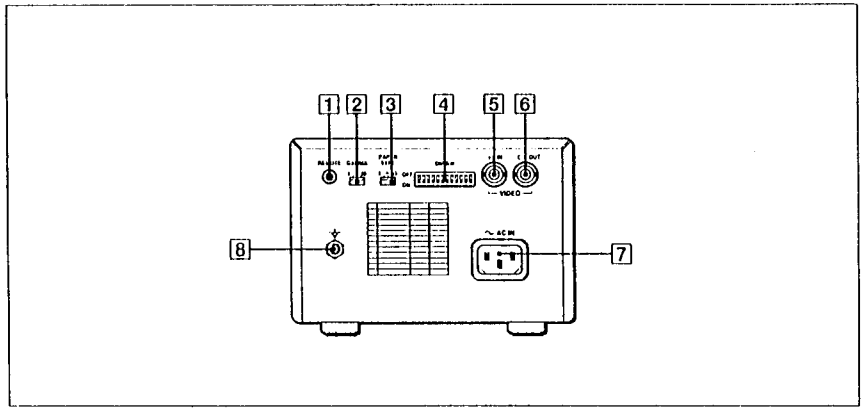
8 PRINT button (12)
Prints the picture currently displayed on the video monitor. The picture displayed when you press the PRINT button is stored in memory.

9 PAPER EMPTY indicator
Lights when the printer is out of paper.

10 OPEN/CLOSE button (10, 14)
Opens or closes the door. Also, stops printing midway.

11 Paper feeder and cutter
Cuts the printing paper.

Back



1 REMOTE connector (5)
Connect the RM-91 remote commander for controlling print operation from a distance. The RM-91 remote commander is supplied with UP-890MD only.

2 GAMMA selector (6)
Changes the print mode to that for high-density printing paper. The selector is effective when the PAPER TYPE selector is set to II or IV.

3 PAPER TYPE selector (6)
Sets the type of paper.

4 DIP SW (switches) (7 – 9)
Sets the print modes and functions.

5 VIDEO IN (input) connector (BNC type) (5)
Connect to the video output connector of the video equipment.

6 VIDEO OUT (output) connector (BNC type) (5)
Connect to the video input connector of the video monitor. The output signal type depends on the setting of the THRU/EE selector.

7 AC IN (AC power input) connector (5)
Connect to a wall outlet using the supplied AC power cord.

8 Equipotential terminal
Equipped only with the UP-890CE/890MD.

1-3. OVERVIEW

The UP-880/890CE/890MD is a black and white video graphic printer that can be used to print images displayed on video monitor.

Clear, consistent print quality
- High definition, 10.2 dots/mm printing using a thermal head with high-speed drive IC.
- 256 gradations of black and white.

Fast printing
- You can make a single print-out in about 3.9 seconds in STD and NORM mode.
- You can make a maximum of 11 copies of the same image continuously.

Two way printing direction and five printing sizes selectable
- The printing direction selector on the front panel enables you to print in vertical and horizontal directions.
- The printing size control on the front panel enables you to select five kinds of printing size.

DIP switches to optimize the printer
- You can make print-outs starting either from the bottom or top of the image by setting the DIRECTION DIP switch.
- You can set the print-out aspect ratio to 4:3 or 1:1 by setting the ASPECT DIP switch.
- You can set the range to be printed by setting the SCAN DIP switch.
- You can save your paper by setting the POSTFEED DIP switch (paper saving function).

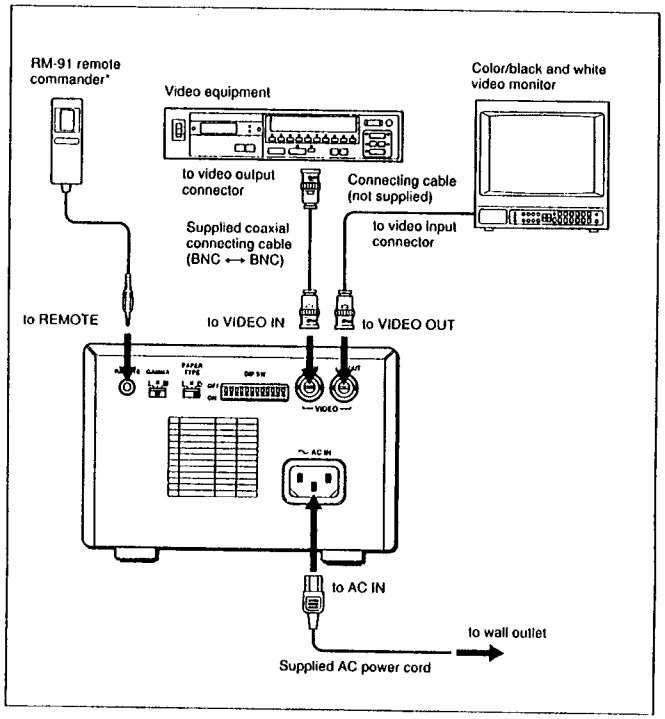
Automatic video signal discrimination
The type of input signal, black and white (EIA or CCIR) or input color (NTSC or PAL), is automatically discriminated and printed in same duration and size.

Alarm buzzer
The alarm buzzer prevents you from making any misoperation.

Easy and quick paper loading
You can load paper just by opening the paper lid with the OPEN/CLOSE button and placing the paper roll.

1-4. CONNECTION

Notes
- Turn off the power to each device before making connection.
- Connect the AC power cord last.

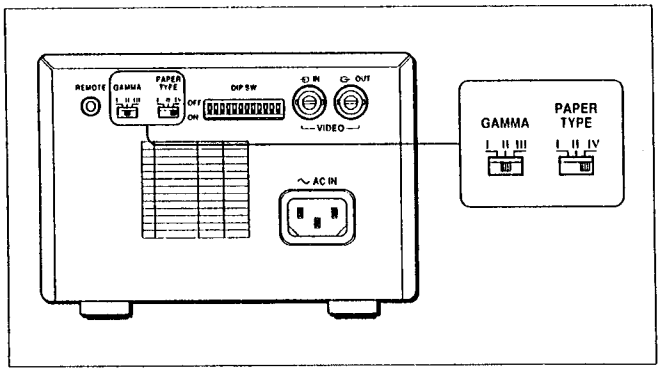


* The RM-91 remote commander is supplied with UP-890MD only.

Setting the Type of Paper

Set the PAPER TYPE selector to the type of paper to be used.
The use of paper other than Sony may result in reduced printer performance and poor print quality.

Type of paper	PAPER TYPE switch position
UPP-110S	I (Normal)
UPP-110HD	II (High density)
UPP-110HA	IV (Enhanced)

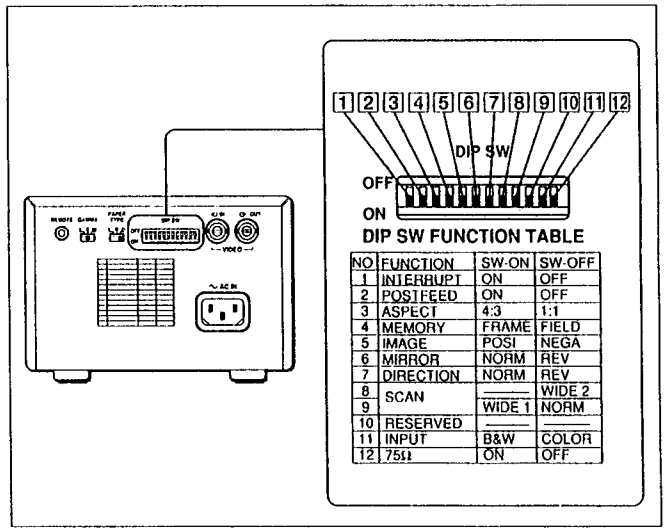


When you use the UPP-110HA or UPP-110HD

When you set the PAPER TYPE selector to II or IV, set the density gradation with the GAMMA selector.
I: Soft gradation
II: Standard
IV: Hard gradation

Setting the DIP Switches

Set the DIP switches according to the required print mode. Before setting the DIP switches, turn the power off. Change the settings using a small pointed tool such as a small screwdriver. The factory settings are as follows.



DIP SW FUNCTION TABLE

NO	FUNCTION	SW-ON	SW-OFF
1	INTERRUPT	ON	OFF
2	POSTFEED	ON	OFF
3	ASPECT	4:3	1:1
4	MEMORY	FRAME	FIELD
5	IMAGE	POSI	NEGA
6	MIRROR	NORM	REV
7	DIRECTION	NORM	REV
8	SCAN	——	WIDE 2
9		WIDE 1	NORM
10	RESERVED	——	——
11	INPUT	B&W	COLOR
12	75Ω	ON	OFF

1 INTERRUPT ON/OFF switch

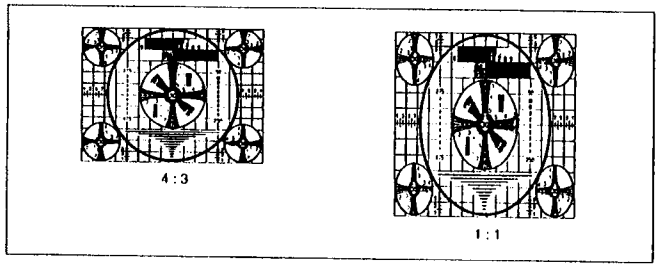
To interrupt the printing under way and print a new picture when you press the PRINT button during printing, set this switch to ON.
To disregard that the PRINT button is pressed during printing and continue the printing under way, set to OFF.
If you press the PRINT button during printing in OFF mode, the alarm buzzer will sound.

2 POSTFEED ON/OFF switch

To feed out extra blank paper once a picture has been printed, set this switch to ON.
To save paper by feeding only a short length of paper after printing a picture, set to OFF. You can make more print-outs per roll of printing paper, but you have to take out and cut the paper yourself.

3 ASPECT 4:3/1:1 switch

Normally keep this switch set to 4:3. When the aspect ratio of the video signal is 1:1, set to 1:1.
The print-out will be longer than a print-out made at 4:3.



4 MEMORY FRAME/FIELD switch

Normally keep this switch set to FRAME (ON). When printing fast-moving pictures (such as a ball being thrown), the print-out may blur. If this happens, set to FIELD. The print-out definition will be poorer but less blurred.

5 IMAGE POSI/NEGA switch

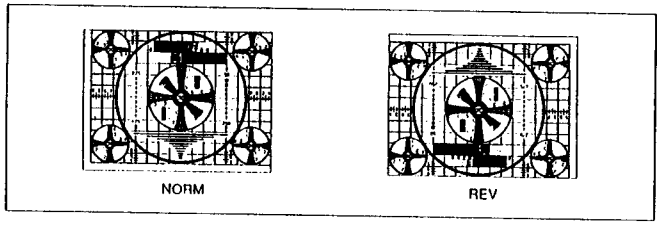
Normally keep this switch set to POSI (ON). To make negative print-outs, set to NEGA (OFF).

6 MIRROR NORM/REV switch

Normally keep this switch set to NORM (ON). To print the right and left sides reversed, set to REV (OFF).

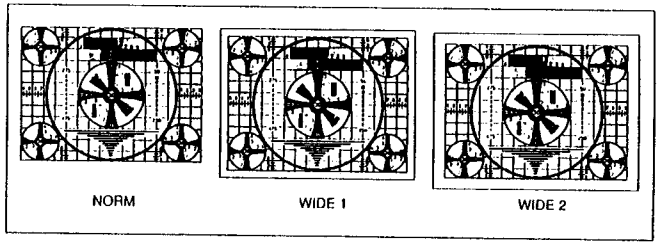
7 DIRECTION NORM/REV switch

Selects whether the top or bottom of the screen is to be printed first.
Normally keep this switch set to NORM (ON). Printing is done from the bottom of the screen. To start printing from the top of the screen, set to REV (OFF).



8 9 SCAN NORM/WIDE 1/WIDE 2 switch

Sets the print-out range. The print-out range is widened in the NORM, WIDE 1, and WIDE 2 order.
To print only the image displayed on the standard screen size of the video monitor, set the SCAN switch 9 to NORM (OFF). To print when the signal scans beyond the edge of the standard monitor screen, set the SCAN switch 9 to WIDE 1 (ON) or the SCAN switch 8 to WIDE 2 (OFF). When you set the SCAN switch 8 to the WIDE 2 position, WIDE 2 is selected regardless of the setting of the SCAN switch 9 position.



10 RESERVED switch

Keep this switch set to ON.

11 INPUT B&W/COLOR switch

Set this switch to B & W (ON) when the signal to be printed is black and white. Set to COLOR (OFF) when the signal is color.

12 75Ω ON/OFF switch

Set this switch to OFF when a video monitor or other video equipment is connected to the VIDEO OUT connector.
Set to ON when nothing is connected to the VIDEO OUT connector.
When you connect two printers to one video equipment, set the 75Ω switch of one of the printer to ON, and the other to OFF.

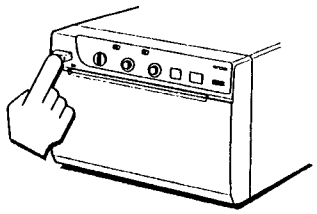
1-6. LOADING PAPER

Notes

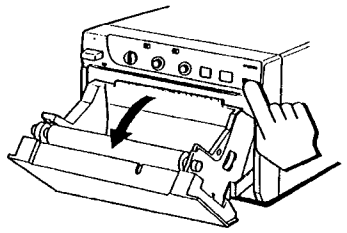
- Do not fold the paper or touch the printing surface. Dust on the printing surface will result in poor print quality.
- After loading the paper roll, pull out and cut off the first 15 to 20 cm (6 to 7⅞ inches) to remove any slack.
- Use only UPP-110 series paper (p. 19).
- Set the PAPER TYPE selector according to the paper type (p. 6).

Loading

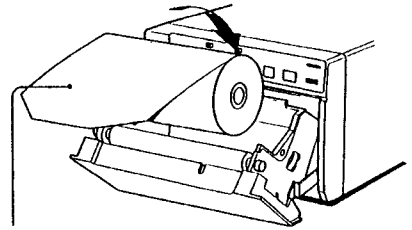
1 Press the power ON/OFF switch to turn on the printer.



2 Press the OPEN/CLOSE button to open the paper lid.

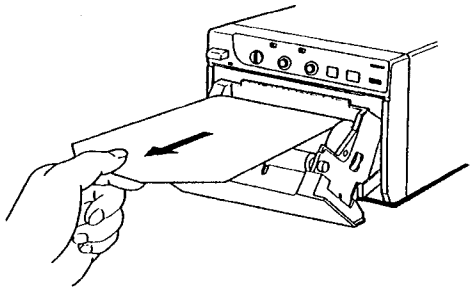


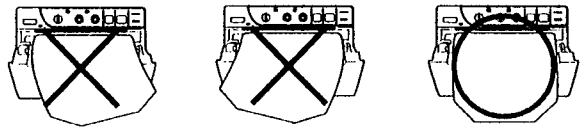
3 Place the paper roll in the printer.



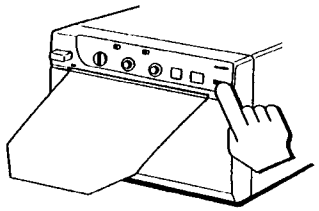
Place the paper with the thermo-sensitive side (printing side) up.

4 Pull out the first 15 to 20 cm (6 to 7⅞ inches) of the paper to remove any slack in the roll.





5 Press the OPEN/CLOSE button to close the paper lid.
You can also close the paper lid simply by pushing it.

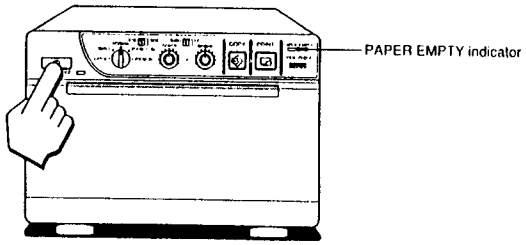


Before making print-outs

- Are the connections correct? (p. 5)
- Is the paper roll loaded properly? (p. 10).
- Is the paper type set correctly? (p. 6).
- Are the DIP switches set correctly? (p. 7 – 9)
- Is the print source being input?

Making Print-outs

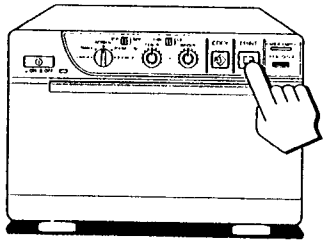
1 Press the power ON/OFF switch to turn on the printer.
The power indicator lights.



2 Make sure that the PAPER EMPTY indicator is not lit.
If lit, load paper.

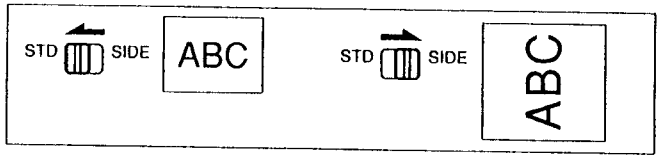
3 Select the printing direction and size.
See "Selecting the Printing Direction" and "Selecting the Printing Size" on the next page.

4 When the picture you want to print is on the video monitor, press the PRINT button.
The printer makes a print-out of the picture displayed at the instant you press the PRINT button.



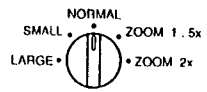
Selecting the printing direction

You can select the vertical or horizontal direction using the STD/SIDE selector.
To print in the vertical direction, set to STD.
To print in the horizontal direction, set to SIDE.



Selecting the printing size

You can print in small or large size.
Also you can enlarge the center of the picture by 1.5 or 2 times.



Control position (mode)	Priting size	
	Vertical (STD)	Horizontal (SIDE)
NORMAL	ABC	ABC
SMALL	ABC ABC	ABC ABC
LARGE	ABC	ABC
ZOOM 1.5X	ABC	ABC
ZOOM 2X	ABC	ABC

To print in SMALL mode

Press the PRINT button twice. When you press the PRINT button once, the buzzer sounds. The printer starts printing after the PRINT button is pressed twice.

Stopping printing midway

Press the OPEN/CLOSE button while printing or while copying. The printer stops printing.

To stop printing and print another picture displayed on the video monitor

To do this, the DIP switch [1] (INTERRUPT) must be set to ON (p. 7).
Press the PRINT button while printing or copying. The printer stops printing and starts printing the picture displayed at the instant you press the PRINT button.

Making copies of the last print-out

Press the COPY button. The printer makes a copy of the last print-out. The last print-out is retained in the printer's memory until you press the PRINT button again or turn the power off.

To copy in different sizes

You can copy the last print-out in different sizes.
Before pressing the COPY button, select the printing size as described in "Selecting the Printing Size".

Notes

- If you press the COPY button immediately after turning the power on, the alarm buzzer will sound as nothing is stored in memory.
- In SMALL mode (p. 13), if you press the COPY button after you have pressed the PRINT button only once, the alarm buzzer will sound and the printer will not copy.

To make multiple copies of the same print-out

Press the COPY button as many times as necessary (maximum 11 copies including the first print-out) while printing or copying the first print-out. Each time you press the COPY button, the short buzzer sounds.

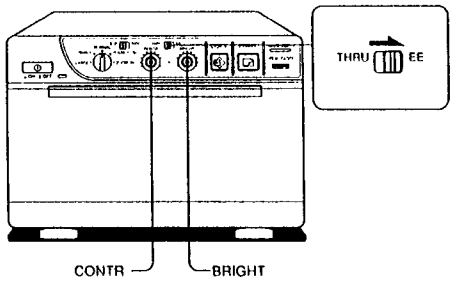
To stop copying midway

Press the OPEN/CLOSE button.

Adjusting the Contrast and Brightness

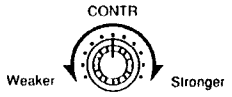
You can adjust the contrast and brightness of the print-out.

1 Set the THRU/EE selector to EE.
You can check the adjusted picture on the video monitor.

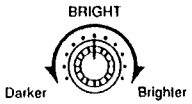


2 Adjust the brightness with the BRIGHT control and the contrast with the CONTR control while watching the picture on the video monitor.

Adjusting the contrast



Adjusting the brightness



To directly input the video signal from the video equipment, which is connected to the printer, to the video monitor

Set the THRU/EE selector to THRU. The video signal is directly input to the video monitor without being processed by the printer's circuitry.

1-8. PRECAUTIONS

On the safety

- Check the operating voltage before operation.
  Operate the unit only with a power source specified in "Specifications".
- Stop operation immediately if any liquid or solid object falls into the cabinet.
  Unplug the unit and have it checked by qualified personnel.
- Unplug the unit from a wall outlet if you will not be using it for a long time.
  Disconnect the power cord by grasping the plug. Never pull the cord itself.
- Do not disassemble the cabinet. Refer servicing to qualified personnel only.
- Do not touch the cutting blade of the printer.
- Connect the power plug of the printer to a wall outlet having protective earth terminal. The safety earth should be properly established.

On operation

Do not turn the power off while the printer is printing. The thermal head may be damaged.

On printer carriage

Do not carry and move the printer when the paper roll is placed in the printer. Doing so may cause malfunction.

On installation

- Place the printer on a level and stable surface during operation.
- Do not install the printer near heat sources. Avoid locations near radiators or air ducts, or place subject to direct sunlight or excessive dust, humidity, mechanical shock or vibration.
- Provide adequate air circulation to prevent heat build-up. Do not place the printer on surfaces such as rugs, blankets, etc., or near materials such as curtains and draperies.

Maintenance

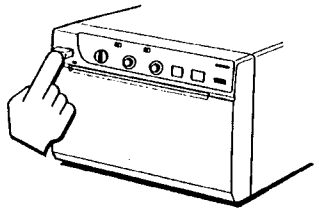
Cleaning the cabinet

Do not use strong solvents to clean the printer. Thinner or abrasive cleansers will damage the cabinet.

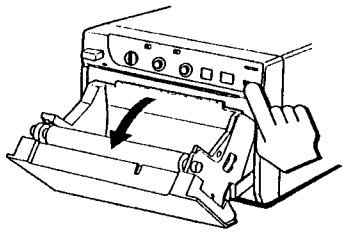
Cleaning the thermal head

If the print-out is dirty or white stripes appear on the print-outs, clean the thermal head using the supplied cleaning sheet.

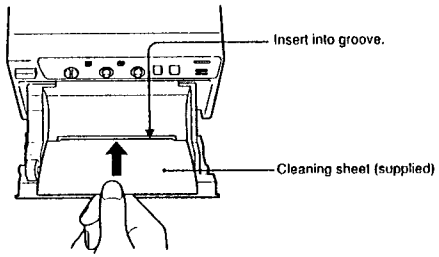
1 Press the power ON/OFF switch to turn on the printer.



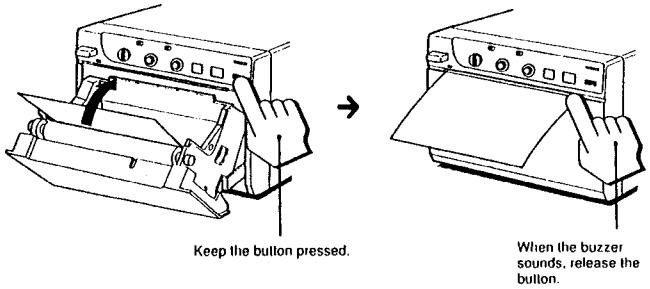
2 Press the OPEN/CLOSE button to open the paper lid.



3 Insert the cleaning sheet, with the black surface facing down, into the groove in the paper lid.



4 Press the OPEN/CLOSE button and keep it pressed.
The paper lid closes and the printer starts cleaning the head.
When the buzzer sounds and the printer starts ejecting the cleaning sheet, release the OPEN/CLOSE button.



5 Remove the cleaning sheet.

Notes

- Do not press the PRINT or COPY button while the cleaning sheet is in the printer.
- Clean the head only when necessary. If you clean the head too often, it may cause malfunction.

1-9. ON THE TYPE OF PAPER

Type of paper

- Use only the Sony UPP-110 series paper. The use of other paper may result in reduced printer performance and poor print quality.
- The following types of paper are available.

Printing density	Type of paper
TYPE I (Normal)	UPP-110S
TYPE II (High density)	UPP-110HD
TYPE IV (Enhanced)	UPP-110HA

Storing paper

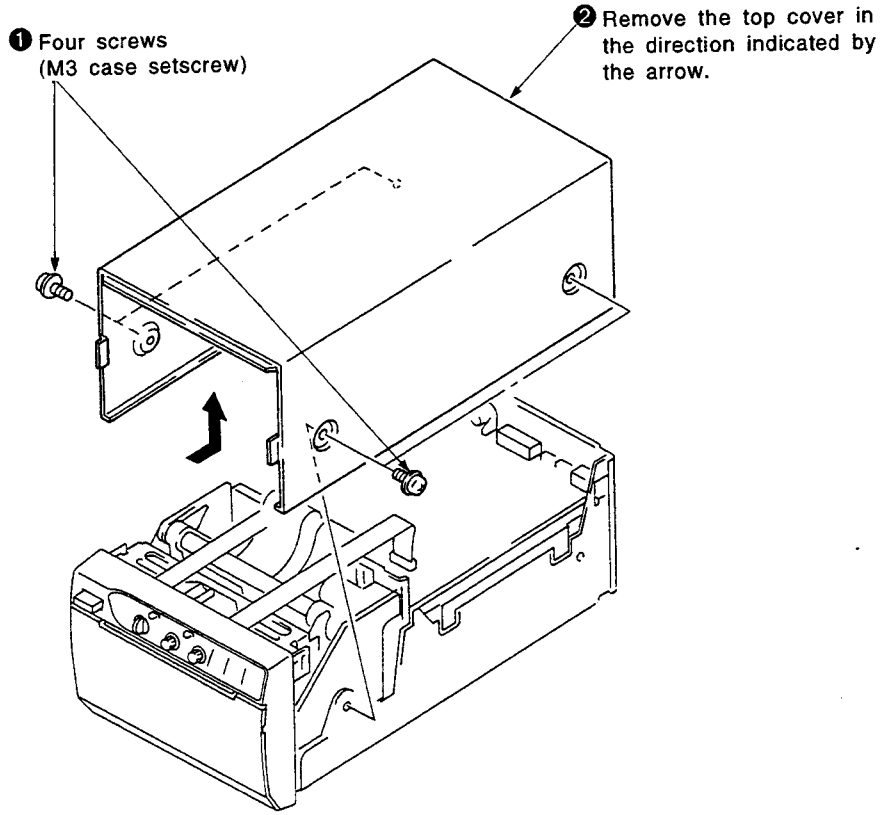
- Store unused or printed paper in a cool, dark place (below 30°C or 86°F). We recommend that you store printed paper in a polypropylene pouch.
- Do not store unused or printed paper in hot or humid place.
- Do not leave unused or printed paper in direct sunlight or other bright place for extended periods.
- Do not allow any volatile organic solvent or vinyl chloride to touch the printed paper. Alcohol, plastic tape or film will fade the print-out.
- To attach printed paper to another piece of paper, use double-sided adhesive tape, or water-based or solid glue.
- Do not stack printed paper on or under a diazo copy sheet. The print-out may become discolor in black.

1-10. TROUBLESHOOTING

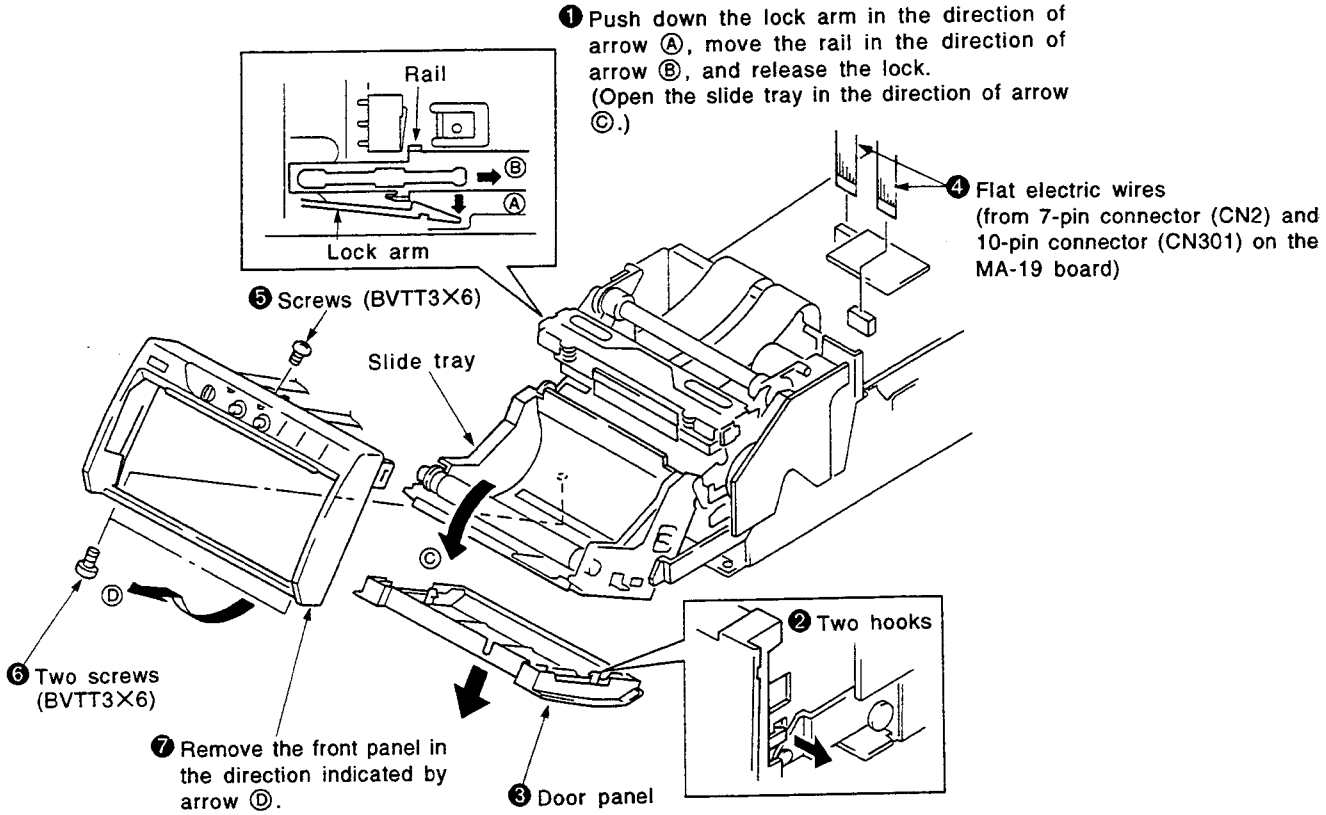
Symptom	Cause/remedy
White specks on first few print-outs.	When printing with a newly inserted roll of paper, dust on the surface of the paper may cause white specks on the print-outs. → Feed the paper by pressing the OPEN/CLOSE button until clean paper appears.
Printing does not start when you press the PRINT button.	• Paper is not fed. → Is the paper slack? → Is the power turned on? → Are all connections correct? (p. 5) → Did you press the PRINT button twice in SMALL mode? • When the alarm buzzer sounds: → Has the thermal head overheated? → Is the video signal of the picture input? → Is the paper loaded correctly? • Paper is fed, but printing does not start. → Is the paper loaded with the thermo-sensitive side up?
Black borders or missing portions around the print-out.	This may result according to the video signal input to the printer. → Change the setting of the SCAN switches (DIP switches [8], [9]). (p. 9)
Paper jam	• Open the paper lid by pressing the OPEN/CLOSE button, then pull the jammed paper slowly and remove it. • There is condensation within the unit. → Moving the unit suddenly from a cold place to a warm place often results in condensation forming. In the event of condensation forming, remove the paper, turn off the power and leave the unit for about one to two hours.
Print-out is dirty.	The thermal head is dirty. → Clean the thermal head with the supplied head cleaning sheet. (p. 17)
The printer stops printing when it prints continuously black pictures.	This is likely to occur when the printer prints continuously 15 or more black pictures. In such a case, the buzzer sounds. This is because that the protective circuit works against heat build-up of the thermal head. Stop printing for a while.
White lines or small letters on the screen are not printed clearly.	Is the INPUT switch (DIP SWITCH [11]) set to B & W when the input signal is a black and white signal? (p. 9)
Small squares appear over the whole screen.	Is the INPUT switch (DIP switch [11]) set to COLOR when the input singal is a color signal? (p. 9)
The print-out is too dark or too light.	• Is the 75Ω switch (DIP switch [12]) set correctly? (p. 9) • Is the GAMMA selector set correctly? (p. 6)
The print-out seems stretched.	The ASPECT switch (DIP switch [3]) is set to 1:1. → Set to 4:3. (p. 8)

SECTION 2
DISASSEMBLY

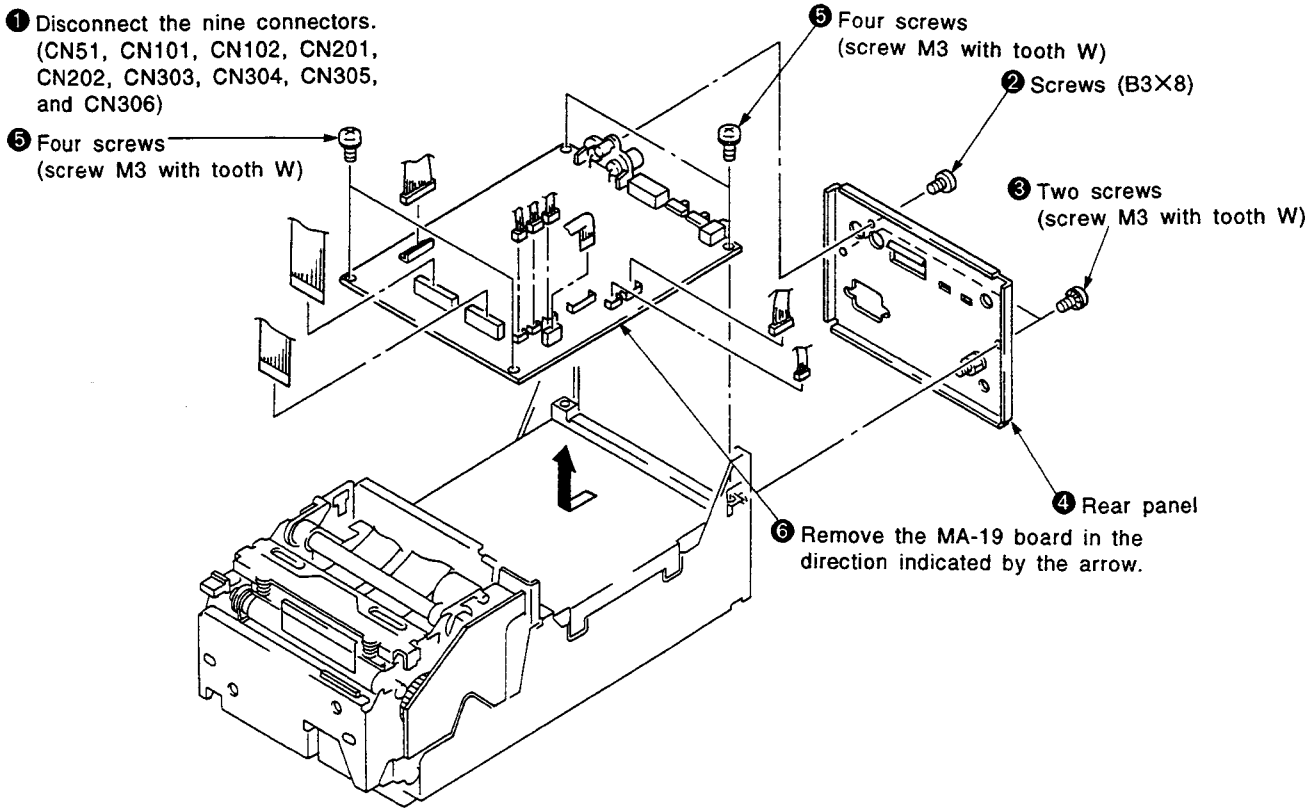
2-1. REMOVING THE TOP COVER



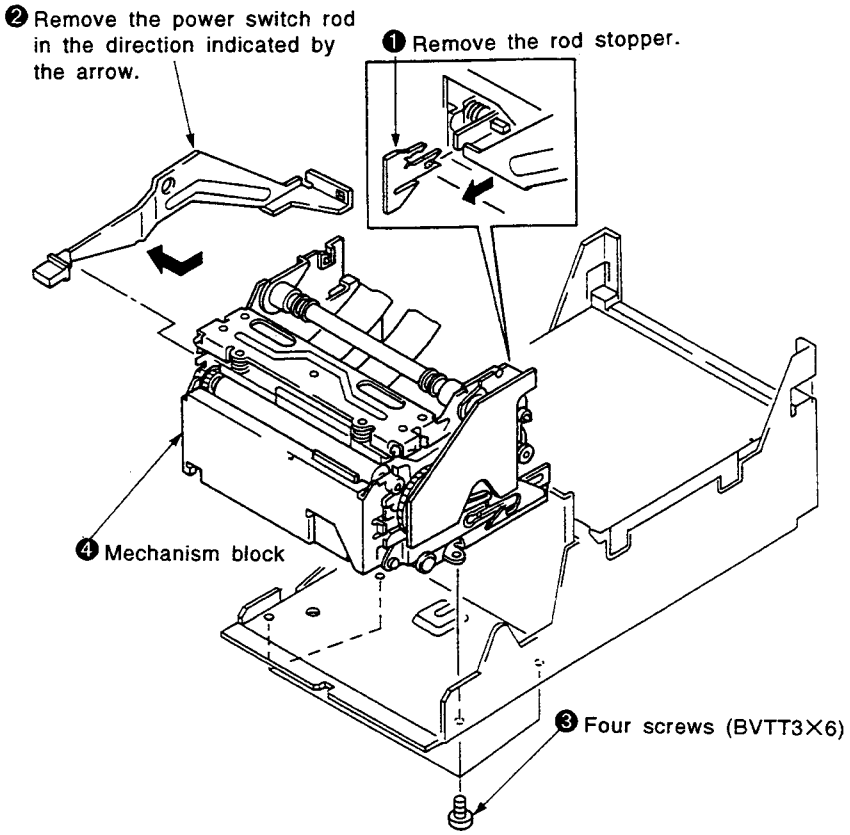
2-2. REMOVING THE DOOR PANEL AND FRONT PANEL UNIT


❶ Push down the lock arm in the direction of arrow Ⓐ, move the rail in the direction of arrow Ⓑ, and release the lock.
(Open the slide tray in the direction of arrow Ⓒ.)
Rail
Ⓑ
Ⓐ
Lock arm
❹ Flat electric wires
(from 7-pin connector (CN2) and 10-pin connector (CN301) on the MA-19 board)
❺ Screws (BVTT3X6)
Slide tray
Ⓒ
Ⓓ
❷ Two hooks
❻ Two screws
(BVTT3X6)
❼ Remove the front panel in the direction indicated by arrow Ⓓ.
❸ Door panel

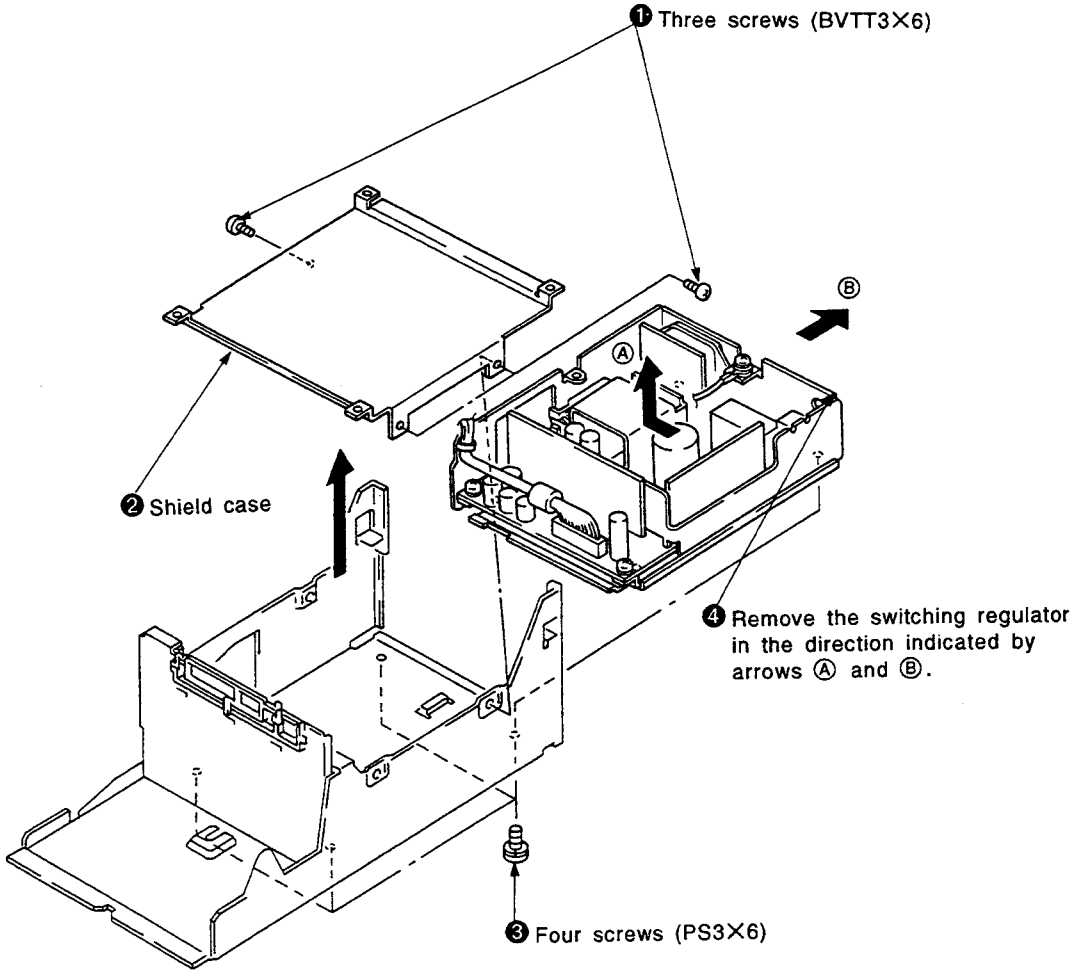
2-3. REMOVING THE MA-19 BOARD


❶ Disconnect the nine connectors. (CN51, CN101, CN102, CN201, CN202, CN303, CN304, CN305, and CN306)
❺ Four screws (screw M3 with tooth W)
❺ Four screws (screw M3 with tooth W)
❷ Screws (B3×8)
❸ Two screws (screw M3 with tooth W)
❹ Rear panel
❻ Remove the MA-19 board in the direction indicated by the arrow.

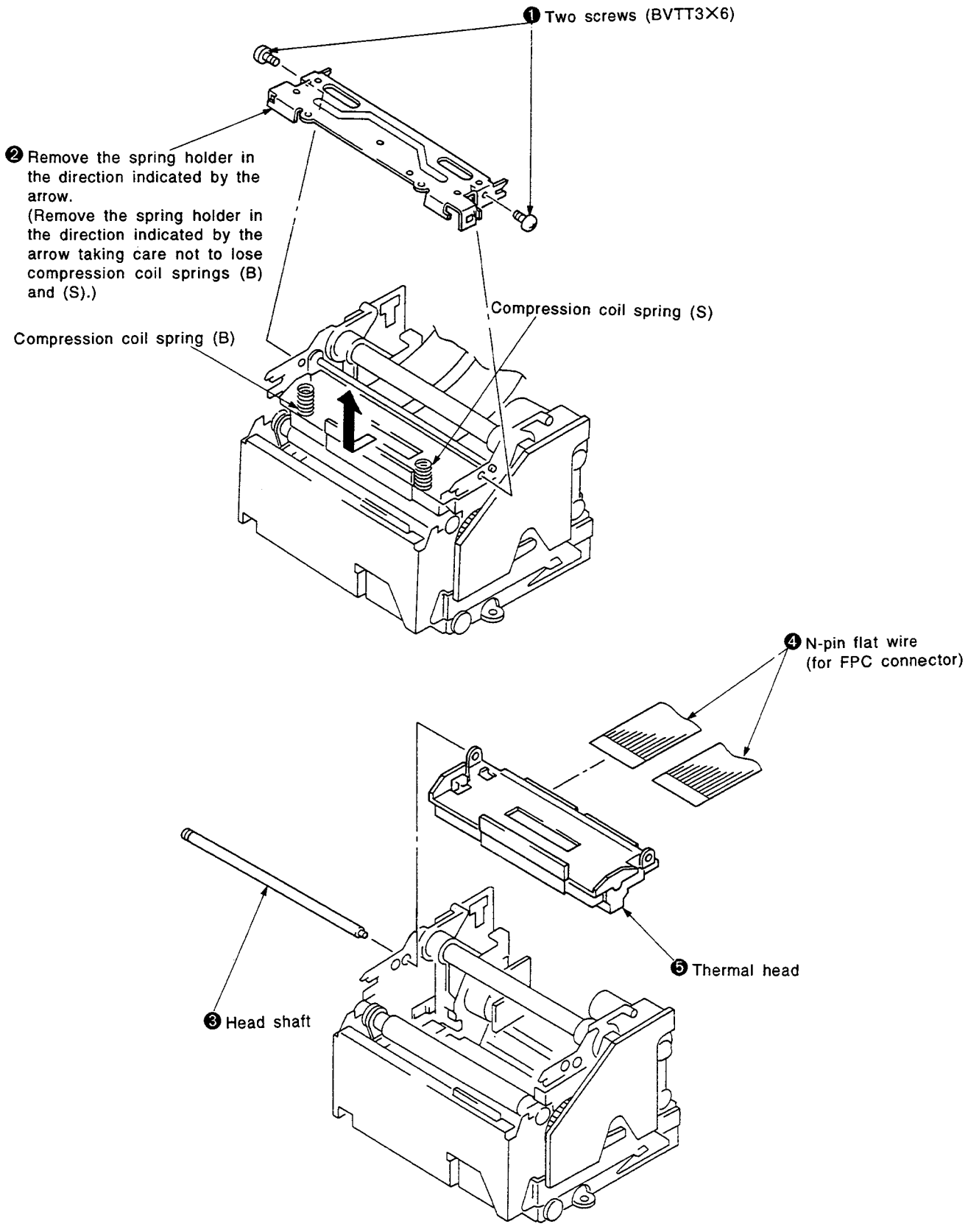
2-4. REMOVING THE MECHANISM BLOCK


❷ Remove the power switch rod in the direction indicated by the arrow.
❶ Remove the rod stopper.
❹ Mechanism block
❸ Four screws (BVTT3×6)

2-5. REMOVING THE SHIELD CASE AND SWITCHING REGULATOR


❶ Three screws (BVTT3×6)
Ⓑ
Ⓐ
❷ Shield case
❹ Remove the switching regulator in the direction indicated by arrows Ⓐ and Ⓑ.
❸ Four screws (PS3×6)

2-6. REMOVING THE THERMAL HEAD

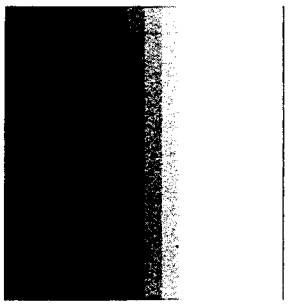
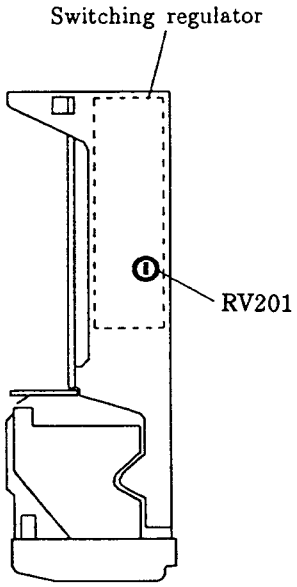

❶ Two screws (BVTT3×6)
❷ Remove the spring holder in the direction indicated by the arrow.
(Remove the spring holder in the direction indicated by the arrow taking care not to lose compression coil springs (B) and (S).)
Compression coil spring (S)
Compression coil spring (B)
❹ N-pin flat wire (for FPC connector)
❺ Thermal head
❸ Head shaft

SECTION 3
ADJUSTMENTS

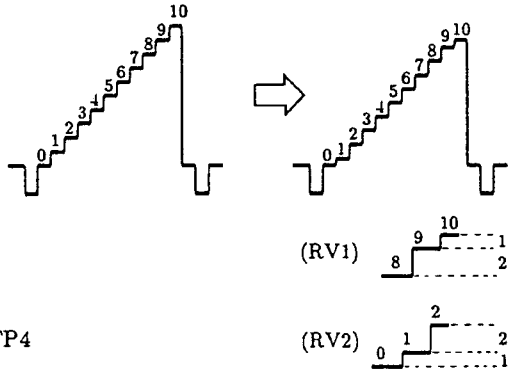
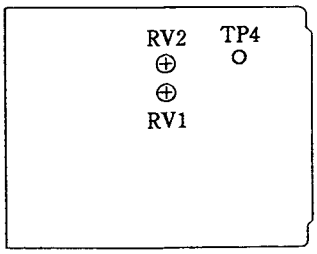
Measuring Equipment Required

1. Oscilloscope
2. Frequency counter
3. Color-bar pattern generator (1410 : NTSC and 1411 : PAL signal generator)
4. Digital multimeter

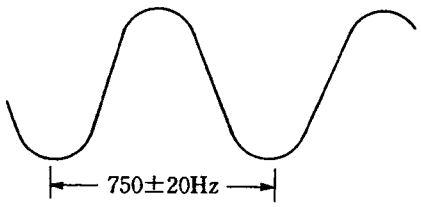
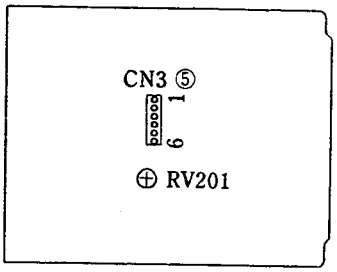
3-1. HEAD VOLTAGE ADJUSTMENT

Conditions for adjustment	Specification	Adjutment
· Input signal : NTSC or PAL signal (1410 or 1411 signal generator) · Turn on the POWER switch while pressing the PRINT and COPY buttons at the same time. Note : Do not release the switch until the buzzer sounds. · For printing-out, press the PRINT button. · Set DIP switches 1 through 12 to ON (lower position), and set DIP switch 1 to OFF. · Use the UPP-110HA paper. · Adjust the paper-type slide switch to the right edge (IV).	 Fig. 1 Adjust RV201 to make the 17-step gradation signal smooth as shown in Fig. 1.	⊘ RV901 

3-2. BRIGHTNESS CONTRAST ADJUSTMENT

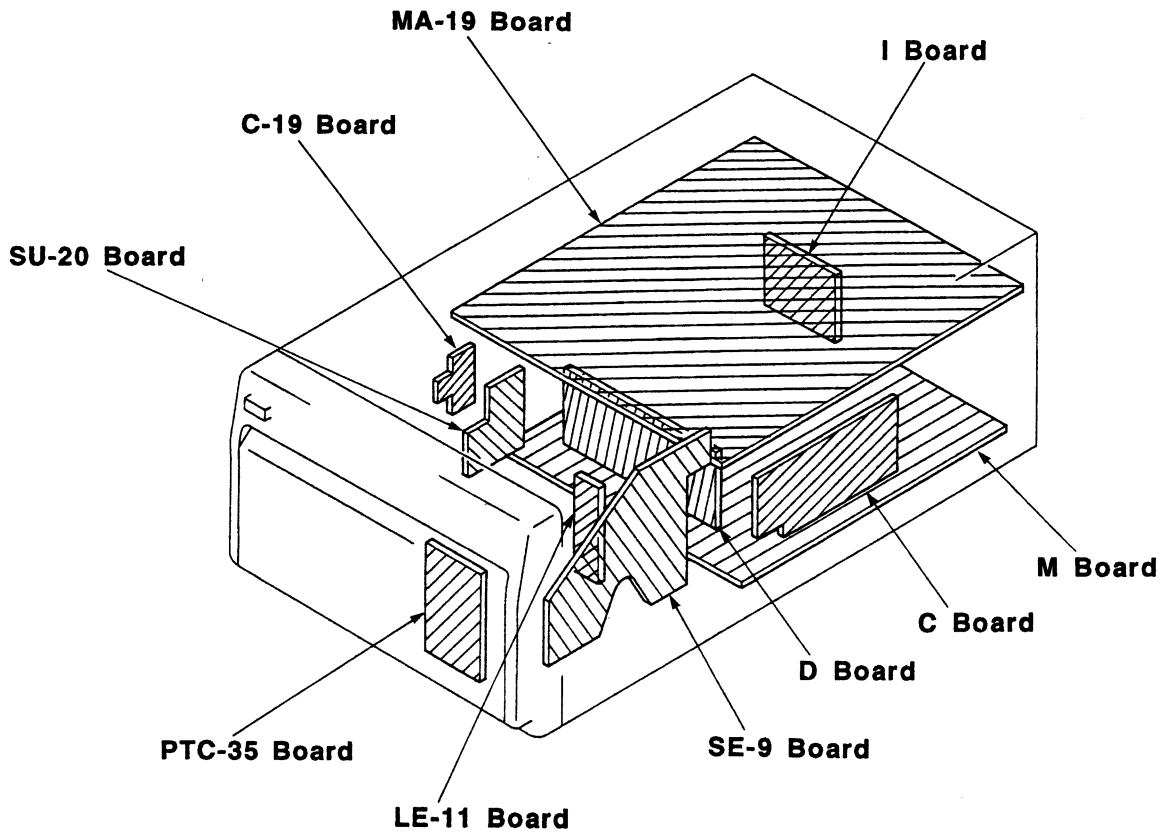
Conditions for adjustment	Specification	Adjutment
· Input signal : 10-step signal (1410 or 1411 signal generator) · Set the CONTR and BRT control knobs to the center position.		⊘ RV1/C-2 (MA-19) ⊘ RV1/C-2 (MA-19) 

3-3. MOTOR SPEED ADJUSTMENT

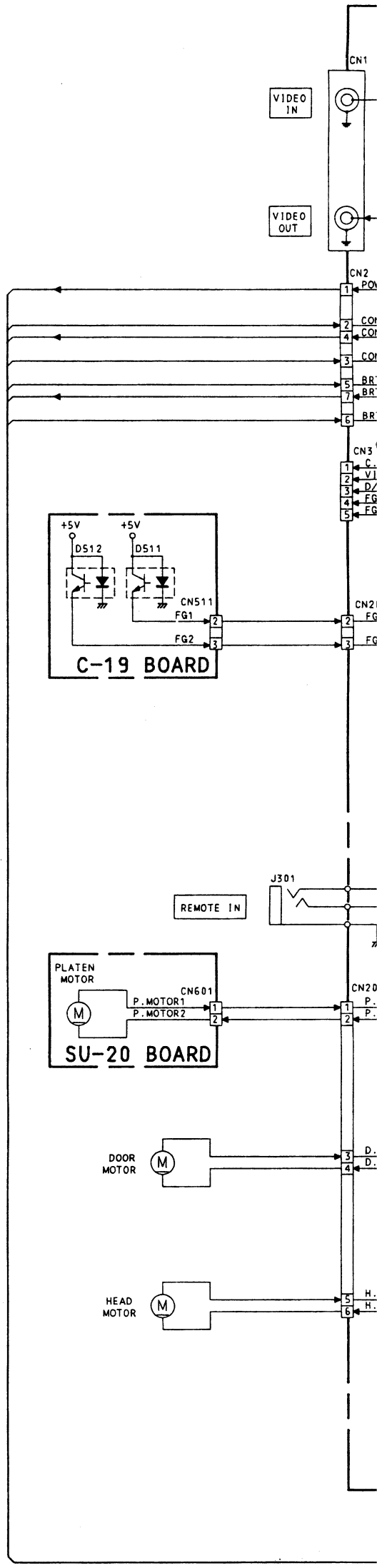
Conditions for adjustment	Specification	Adjustment
· Input signal : Color-bar (1410 or 1411 signal generator) · Press the PRINT button to measure the waveform at pin ⑤ of connector CN3. · Set DIP switches 1 through 12 to ON (lower position). · Use the UPP-110HA paper. Note : Do not adjust while a print blank strip is fed.	 CN3 ⑤	◐ RV201/C-3 (MA-19) 

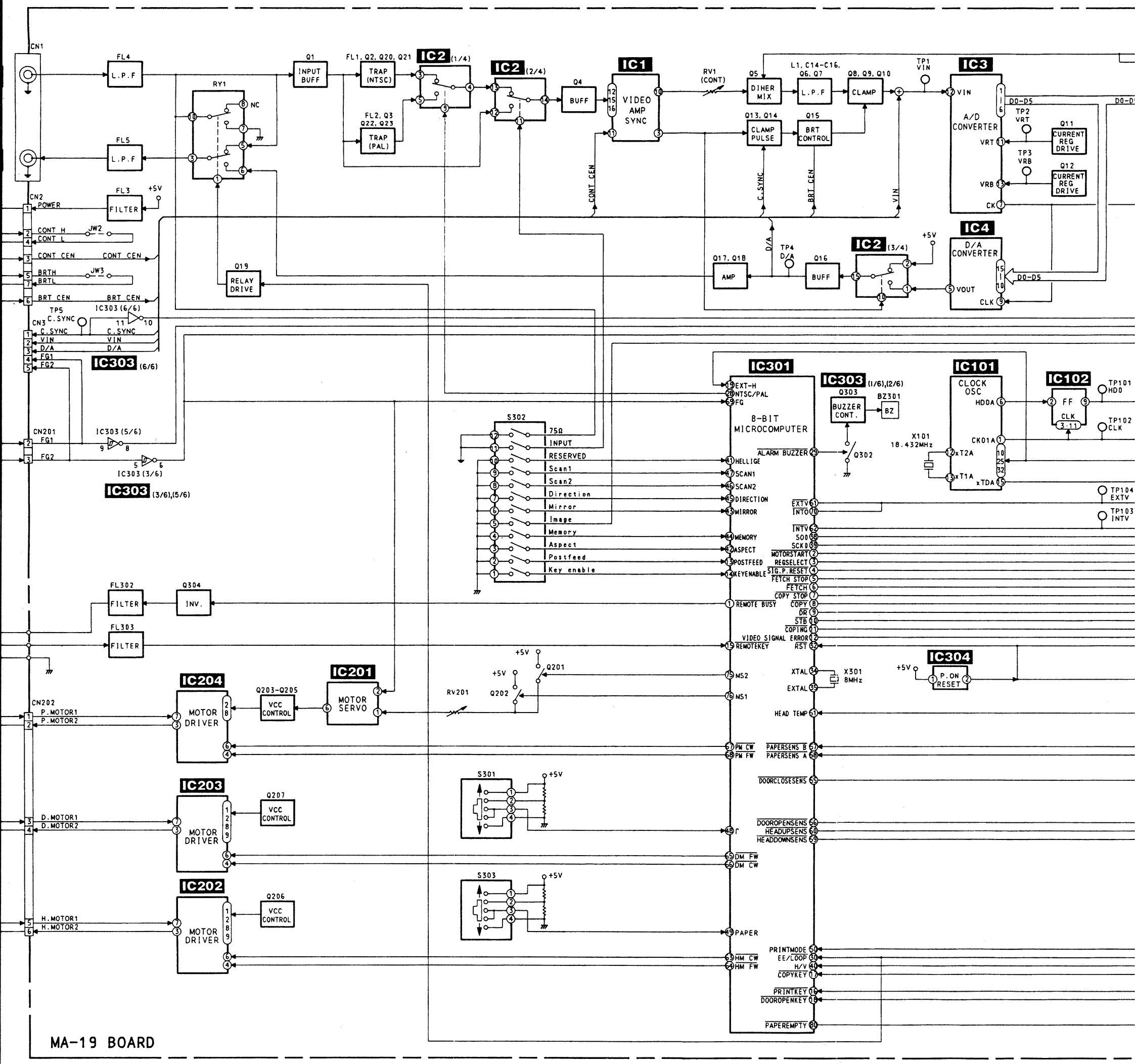
SECTION 4
DIAGRAMS

4-1. CIRCUIT BOARDS LOCATION

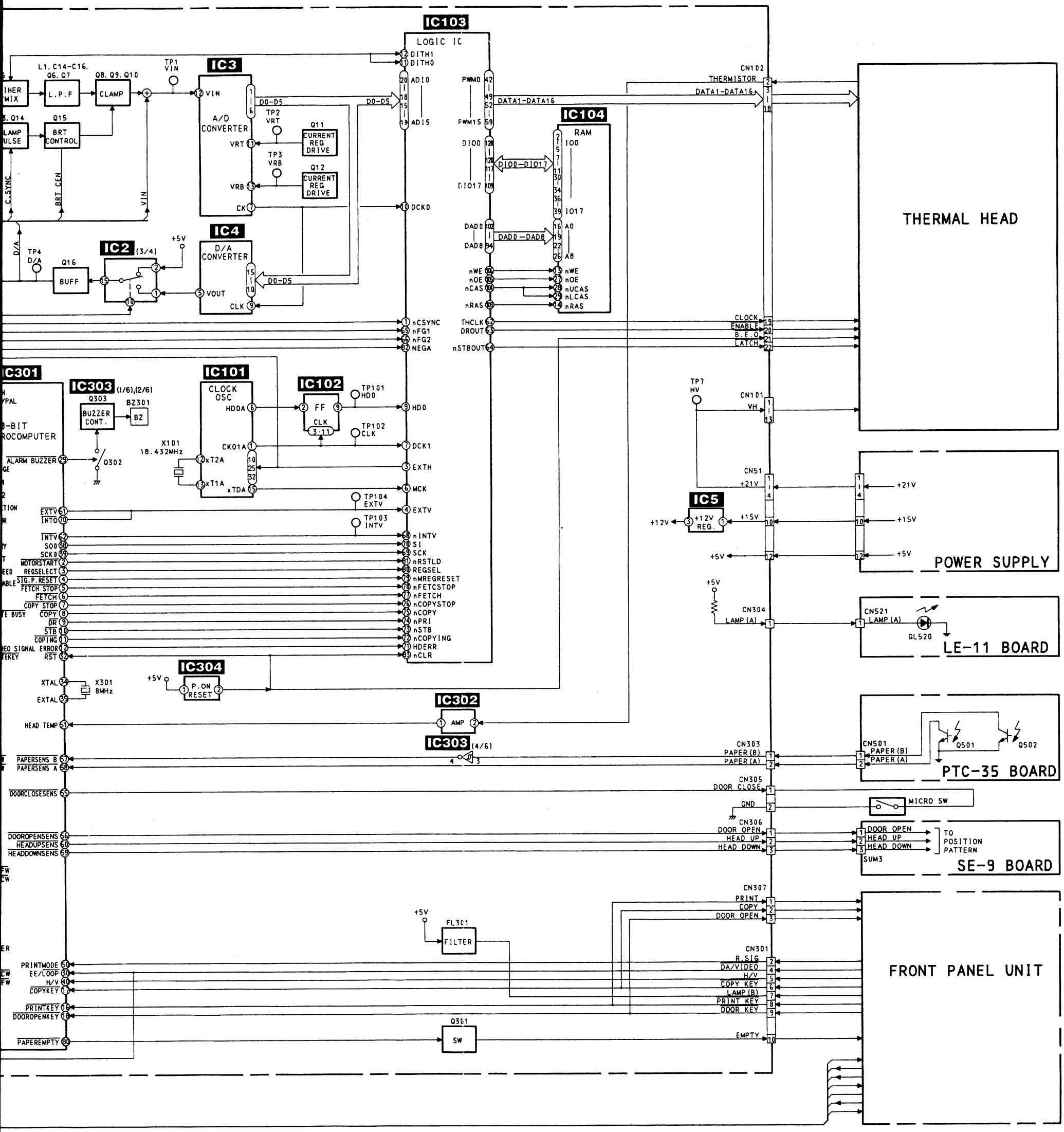


4-2. BLOCK DIAGRAM




CN1
FL4
L.P.F
FL5
L.P.F
RY1
NC
Q1
INPUT BUFF
FL1, Q2, Q20, Q21
TRAP (NTSC)
FL2, Q3 Q22, Q23
TRAP (PAL)
IC2 (1/4)
IC2 (2/4)
Q4
BUFF
IC1
VIDEO AMP SYNC
RV1 (CONT)
Q5
DIHER MIX
L1, C14-C16, Q6, Q7
L.P.F
Q8, Q9, Q10
CLAMP
TP1 VIN
IC3
A/D CONVERTER
VIN
VRT
VRB
CK
D0-D5
TP2 VRT
TP3 VRB
Q11 CURRENT REG DRIVE
Q12 CURRENT REG DRIVE
Q13, Q14
CLAMP PULSE
Q15
BRT CONTROL
CONT CEN
C.SYNC
BRT CEN
VIN
IC4
D/A CONVERTER
VOUT
CLK
D0-D5
TP4 D/A
Q16
BUFF
Q17, Q18
AMP
IC2 (3/4)
+5V
CN2
POWER
FL3
FILTER
+5V
CONT H
CONT L
JW2
CONT CEN
BRTH
BRTL
JW3
BRT CEN
Q19
RELAY DRIVE
TP5 C.SYNC
IC303 (6/6)
CN3
C.SYNC
VIN
D/A
FG1
FG2
IC303 (6/6)
CN201
FG1
FG2
IC303 (5/6)
IC303 (3/6)
IC303 (3/6),(5/6)
S302
75Ω
INPUT
RESERVED
Scan1
Scan2
Direction
Mirror
Image
Memory
Aspect
Postfeed
Key enable
IC301
8-BIT MICROCOMPUTER
EXT-H
NTSC/PAL
FG
HELLIGE
SCAN1
SCAN2
DIRECTION
MIRROR
MEMORY
ASPECT
POSTFEED
KEYENABLE
REMOTE BUSY
REMOTEKEY
IC303 (1/6),(2/6)
Q303
BUZZER CONT.
BZ301
BZ
ALARM BUZZER
Q302
IC101
CLOCK OSC
HD0A
CK01A
xT2A
xT1A
xTDA
X101 18.432MHz
IC102
FF
CLK
3-11
TP101 HD0
TP102 CLK
TP104 EXTV
TP103 INTV
EXTV
INTO
INTV
SO0
SCK0
MOTORSTART
REGSELECT
SIG.P.RESET
FETCH STOP
FETCH
COPY STOP
COPY
DR
STB
COPING
VIDEO SIGNAL ERROR
RST
XTAL
EXTAL
X301 8MHz
IC304
P.ON RESET
HEAD TEMP
PW CW
PW FW
PAPERSENS B
PAPERSENS A
DOORCLOSESENS
DOOROPENSENS
HEADUPSENS
HEADDOWNSENS
DM FW
DM CW
PAPER
HM CW
HM FW
PRINTMODE
EE/LOOP
H/V
COPYKEY
PRINTKEY
DOOROPENKEY
PAPEREMPTY
MS2
MS1
+5V
Q201
Q202
RV201
S301
S303
FL302
FILTER
Q304
INV.
FL303
FILTER
IC204
MOTOR DRIVER
Q203-Q205
VCC CONTROL
IC201
MOTOR SERVO
CN202
P.MOTOR1
P.MOTOR2
IC203
MOTOR DRIVER
Q207
VCC CONTROL
D.MOTOR1
D.MOTOR2
IC202
MOTOR DRIVER
Q206
VCC CONTROL
H.MOTOR1
H.MOTOR2

MA-19 BOARD


IC103
LOGIC IC
DITH1
DITH0
AD10
AD15
DCK0
IC3
A/D CONVERTER
VIN
D0-D5
VRT
VRB
CK
TP1 VIN
TP2 VRT
TP3 VRB
Q11 CURRENT REG DRIVE
Q12 CURRENT REG DRIVE
L1, C14-C16, Q6, Q7
Q8, Q9, Q10
L.P.F
CLAMP
Q14
Q15
LAMP PULSE
BRT CONTROL
C.SYNC
BRT CEN
VIN
IC4
D/A CONVERTER
IC2 (3/4)
+5V
TP4 D/A
Q16
BUFF
D/A
IC104
RAM
PWM0
PWM15
DIO0
DIO17
DIO0-DIO17
DAD0
DAD8
DAD0-DAD8
nWE
nOE
nCAS
nRAS
nUCAS
nLCAS
THCLK
DROUT
nSTBOUT
DATA1-DATA16
CN102
THERMISTOR
THERMAL HEAD
CLOCK
ENABLE
B.E.O
LATCH
nCSYNC
nFG1
nFG2
NEGA
IC301
8-BIT MICROCOMPUTER
IC303 (1/6),(2/6)
Q303
BUZZER CONT.
BZ301
BZ
ALARM BUZZER
Q302
IC101
CLOCK OSC
X101 18.432MHz
HD0A
CK01A
xT2A
xT1A
xTDA
IC102
FF
CLK
3-11
TP101 HD0
TP102 CLK
TP104 EXTV
TP103 INTV
HD0
DCK1
EXTH
MCK
EXTV
nINTV
SI
SCK
nRSTLD
REGSEL
nMREGRESET
nFETCSTOP
nFETCH
nCOPYSTOP
nCOPY
nPRI
nSTB
nCOPYING
HDERR
nCLR
TP7 HV
CN101
VH
IC5
+12V REG.
+21V
+15V
+5V
CN51
POWER SUPPLY
CN304
LAMP (A)
CN521
LAMP (A)
GL520
LE-11 BOARD
EXTV
INTO
INTV
SOD
SCKO
MOTORSTART
REGSELECT
SIG.P.RESET
FETCH STOP
FETCH
COPY STOP
COPY
DR
STB
COPING
ERROR
RST
XTAL
EXTAL
X301 8MHz
IC304
P.ON RESET
IC302
AMP
HEAD TEMP
IC303 (4/6)
PAPERSENS B
PAPERSENS A
DOORCLOSESENS
DOOROPENSENS
HEADUPSENS
HEADDOWNSENS
CN303
PAPER(B)
PAPER(A)
CN501
Q501
Q502
PTC-35 BOARD
CN305
DOOR CLOSE
GND
MICRO SW
CN306
DOOR OPEN
HEAD UP
HEAD DOWN
TO POSITION PATTERN
SUM3
SE-9 BOARD
CN307
PRINT
COPY
DOOR OPEN
FL301
FILTER
PRINTMODE
EE/LOOP
H/V
COPYKEY
PRINTKEY
DOOROPENKEY
PAPEREMPTY
Q301
SW
CN301
R.SIG
DA/VIDEO
H/V
COPY KEY
LAMP (B)
PRINT KEY
DOOR KEY
EMPTY
FRONT PANEL UNIT

4-3. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

MA-19 (MEMORY CONTROL, VIDEO, SYNC) SE-9 (POS. SENSOR) PTC-35 (PAPER SENSOR) SU-20 (PLATEN MOTOR) LE-11 (LAMP) C

1 2 3 4 5 6 7 8 9 10 11

A B C D E F G H I J K L M N O

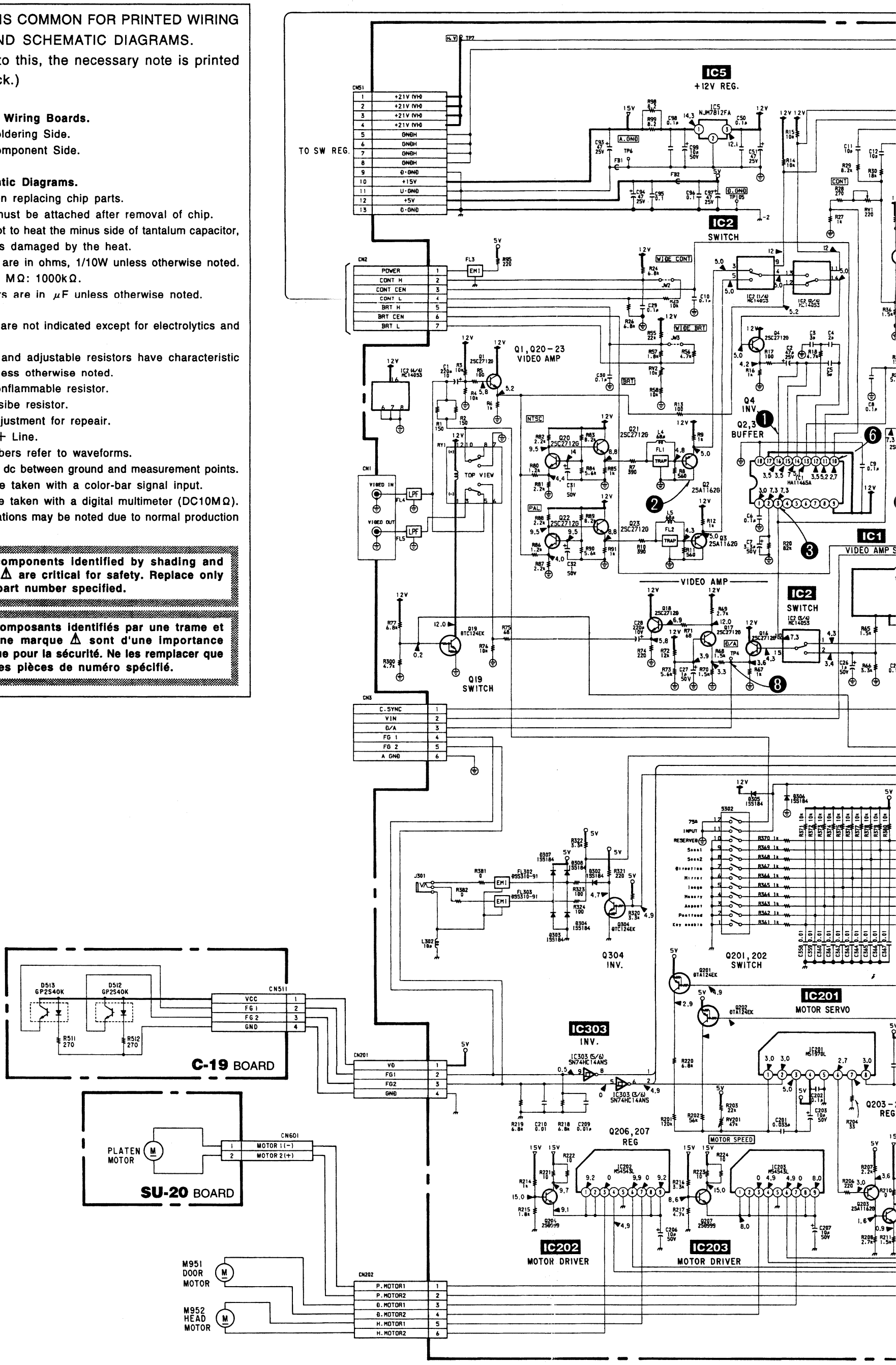
THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

- **For Printed Wiring Boards.**
- ▒▒▒▒ : Soldering Side.
- ▒▒▒▒ : Component Side.

- **For Schematic Diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/10W unless otherwise noted.
  kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted.
  pF: μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- ▭ : fusibe resistor.
- ▭ : adjustment for repeair.
- ▬ : B+ Line.
- Circled numbers refer to waveforms.
- Voltages are dc between ground and measurement points.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par une trame et par une marque ⚠ sont d'une importance critique pour la sécurité. Ne les remplacer que par des pièces de numéro spécifié.



MAIN BLOCK MA-19 | MAIN BLOCK MA-19

11	12	13	14	15	16	17	18	19	20	21	22

Q5,6 GAIN CONT

Q7,8,9 AMP

Q10 BUFFER

Q11,12 REF. VOLTAGE GEN.

Q13,14,15 AMP

IC1 VIDEO AMP SYNC

IC3 A/D CONVERTER

IC4 D/A CONVERTER

IC303 INV.

IC104 RAM

IC103 LOGIC

IC102 FF

IC101 CLOCK OSC

IC304 RESET GEN.

Q302,303 SWITCH

IC301 8-BIT MICROCOMPUTER

IC204 MOTOR DRIVER

IC302 AMP

Q203-205 REG.

MICRO SW

IC103
LOGIC

IC103
CX88938Q

IC104
HM514280AJ-7

IC301
CXP80116

IC301
8-BIT MICROCOMPUTER

IC303
INV.

IC303 (4/6)
SN74HC14AN5

Q301
DRIVER

Q301
DTC124EK

CN101
1	VH
2	VH
3	VH
4	VH
5	VH
6	VH
7	VH
8	VH
9	VH
10	VH
11	VH
12	VH
13	VH
14	GNDH
15	GNDH
16	GNDH
17	GNDH
18	GNDH
19	GNDH
20	GNDH
21	GNDH
22	GNDH
23	GNDH
24	GNDH
25	GNDH
26	GNDH

CN102
1	THERMISTOR
2	THERMISTOR
3	DATA16
4	DATA15
5	DATA14
6	DATA13
7	DATA12
8	DATA11
9	DATA10
10	DATA9
11	DATA8
12	DATA7
13	DATA6
14	DATA5
15	DATA4
16	DATA3
17	DATA2
18	DATA1
19	CLOCK
20	ENABLE
21	B.E.D
22	LATCH
23	VDD
24	GND
25	VDD
26	GND

THERMAL HEAD

CN301
1	+5V
2	R.SIG
3	D GND
4	DA/VIDEO
5	H/V
6	COPYKEY
7	LAMP (B)
8	PRINTKEY
9	DOORKEY
10	EMPTY

CN302
1	VD
2	TEST0
3	TEST1
4	TEST2
5	T.ENABLE
6	T.CLK
7	T.DATA
8	GND

CN307
1	PRINT
2	COPY
3	DOOR OPEN
4	GND

FRONT PANEL UNIT
POWER
CONT H
CONT CEN
CONT L
BRT H
BRT CEN
BRT L
+5V
R.SIG
D GND
DA/VIDEO
H/V
COPY KEY
LAMP (B)
PRINTKEY
DOOR KEY
EMPTY
VD
TEST 0
TEST 1
TEST 2
T.ENABLE
T.CLK
T.DATA
GND
PRINT
COPY
DOOR OPEN
GND

CN303
1	PAPER (B)
2	PAPER (A)
3	D GND

CN304
1	LAMP (A)
2	D GND

CN501
1	PAPER B
2	PAPER A
3	D.GND

PTC-35 BOARD

CN521
1	Lamp A
2	D.GND

LE-11 BOARD

MA-19 BOARD

CN305
1	DOOR CLOSE
2	D.GND

MICRO SW

CN306
1	DOOR OPEN
2	HEAD UP
3	HEAD DOWN
4	D.GND
5	D.GND
6	D.GND
7	D.GND

SUM3
DOOR OPEN	1
HEAD UP	2
HEAD DOWN	3
D.GND	4
D.GND	5
D.GND	6
D.GND	7

TO POSITION PATTERN

SE-9 BOARD

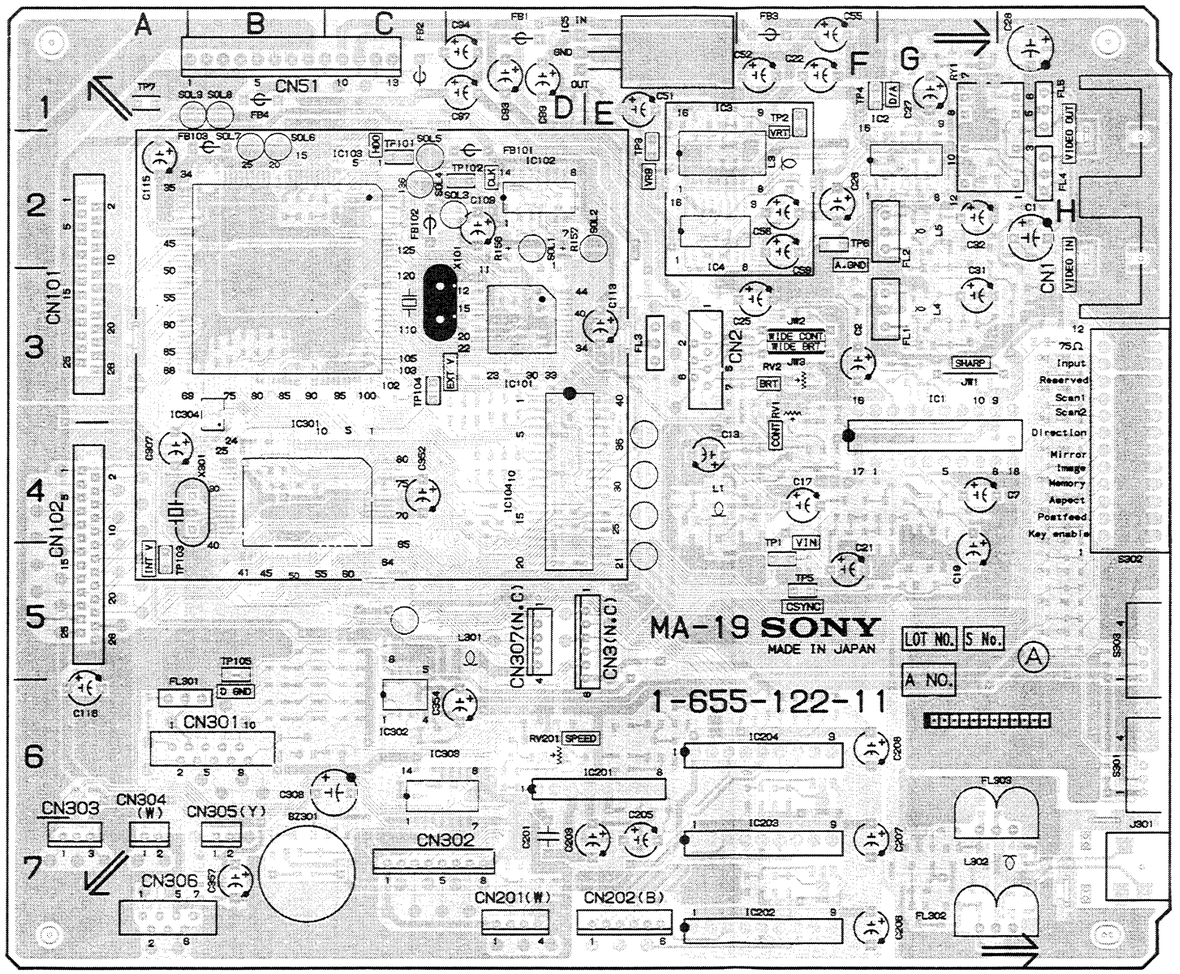
MAIN BLOCK	MAIN BLOCK
MA-19	MA-19

MA-19 (MEMORY CONTROL, VIDEO, SYNC) SE-9 (POS. SENSOR) PTC-35 (PAPER SENSOR) SU-20 (PLATEN MOTOR) LE-11 (LAMP) C-19 (SENSOR)

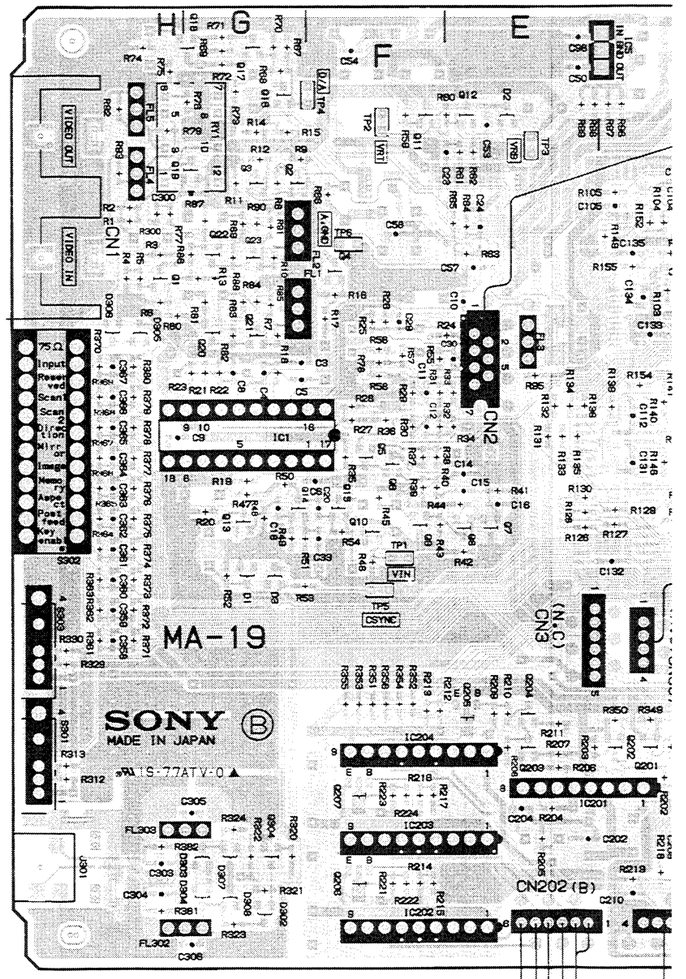
MA-19 BOARD

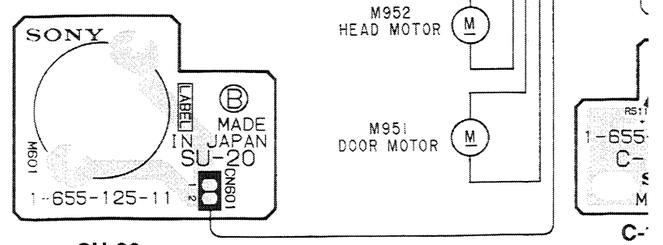
BZ301	B-7		J301	H-7	
CN1	H-2		L1	E-4	
CN2	E-3		L3	F-2	
CN3	E-5		L4	G-3	
CN101	A-3		L5	G-2	
CN102	A-5		L301	D-5	
CN201	D-7		L302	H-7	
CN202	E-7				
CN301	B-6		Q1	H-3	S
CN302	C-7		Q2	G-2	S
CN303	A-7		Q3	G-2	S
CN304	A-7		Q4	F-3	S
CN305	B-7		Q5	F-4	S
CN306	A-7		Q6	F-4	S
CN307	D-5		Q7	E-4	S
			Q8	E-4	S
D1	G-5	S	Q9	F-4	S
D2	E-1	S	Q10	F-4	S
D3	G-5	S	Q11	F-1	S
D301	C-6	S	Q12	E-1	S
D302	G-7	S	Q13	G-4	S
D303	G-7	S	Q14	G-4	S
D304	G-7	S	Q15	F-4	S
D305	H-3	S	Q16	G-1	S
D306	H-3	S	Q17	G-1	S
D307	G-7	S	Q18	G-1	S
D308	G-7	S	Q19	G-2	S
			Q20	G-3	S
FB1	D-1		Q21	G-3	S
FB2	C-1		Q22	G-2	S
FB3	F-1		Q23	G-2	S
FB4	B-1		Q201	D-6	S
FB101	D-2		Q202	D-6	S
			Q203	E-6	S
FL1	G-3		Q204	E-6	S
FL2	G-2		Q205	E-6	S
FL3	E-3		Q206	F-7	S
FL4	H-2		Q207	F-6	S
FL5	H-1		Q301	B-6	S
FL301	A-6		Q302	B-7	S
FL302	G-7		Q303	B-7	S
FL303	G-6		Q304	G-7	S
IC1	G-4		RV1	F-3	
IC2	G-2		RV2	F-3	
IC5	D-1		RV201	D-6	
IC101	D-3				
IC102	D-2		RY1	G-1	
IC103	B-3				
IC104	D-4		S301	H-6	
IC201	E-6		S302	H-4	
IC202	F-7		S303	H-4	
IC203	F-7				
IC204	F-6		X101	C-3	
IC301	B-4		X301	B-4	
IC302	C-6				
IC303	C-6				
IC304	B-3				

S:SOLDERING SIDE

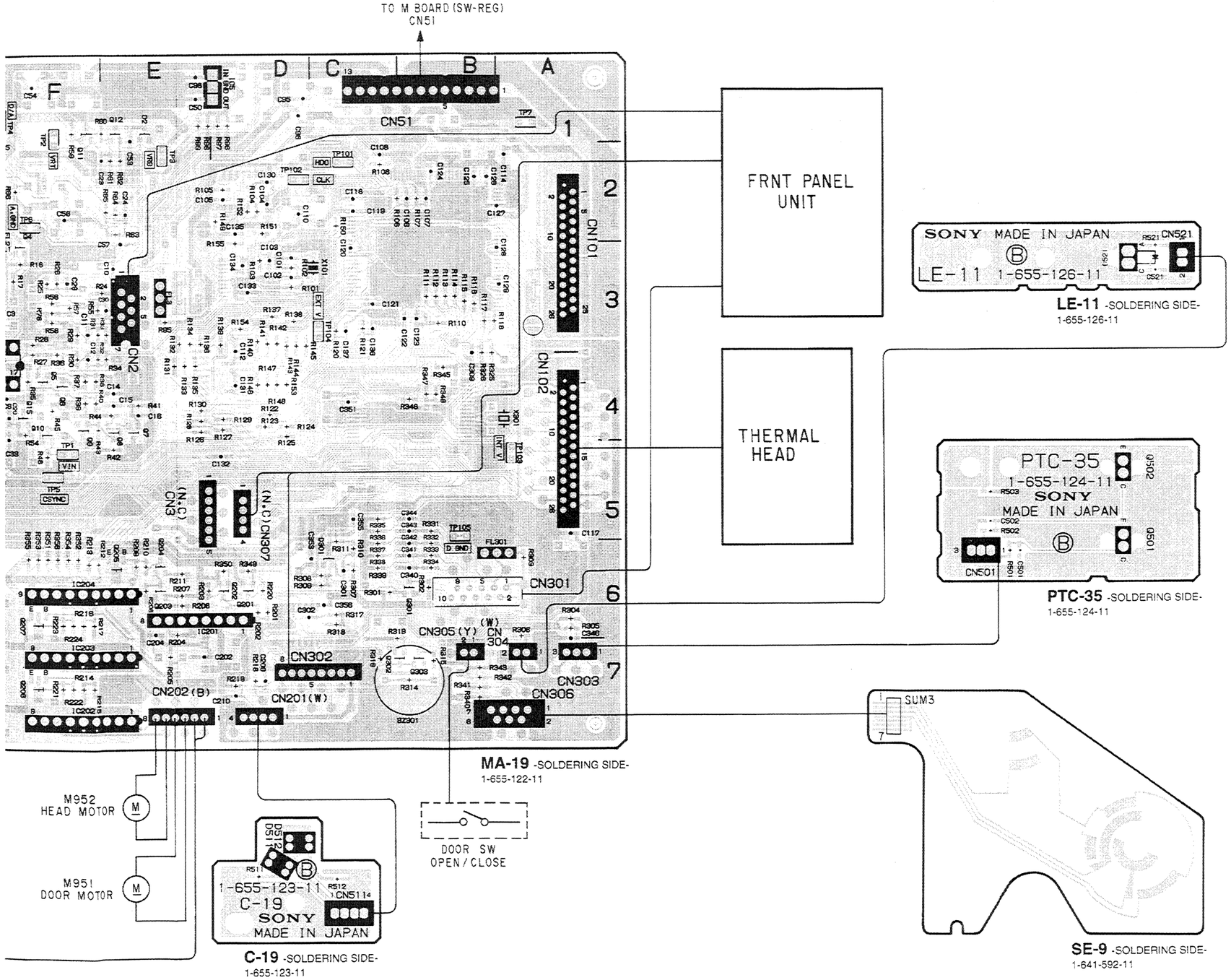


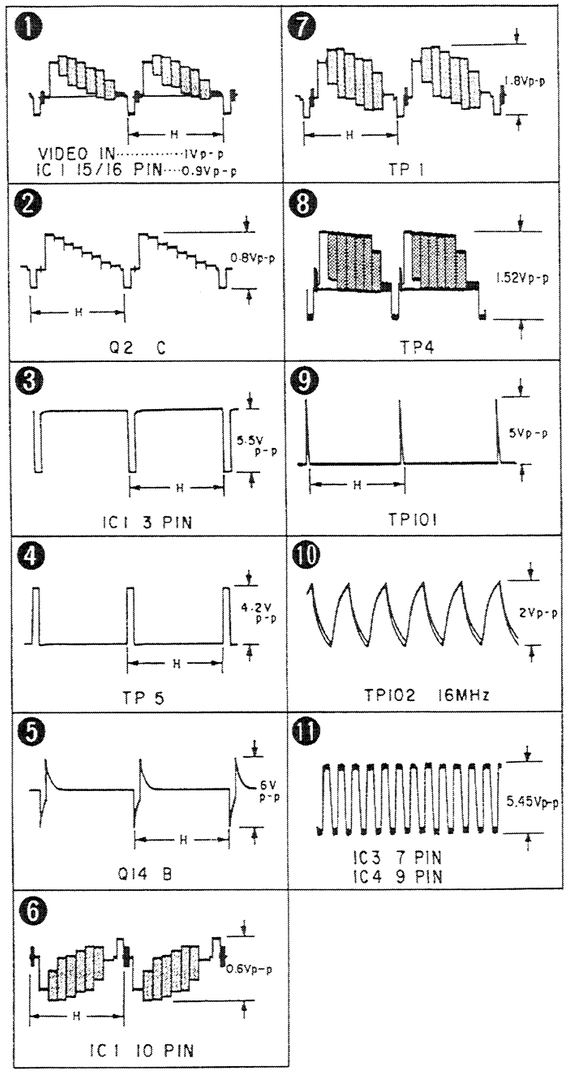
MA-19 -COMPONENT SIDE-
1-655-122-11





SU-20 -SOLDERING SIDE-
1-655-125-11


TO M BOARD (SW-REG)
CN51
CN51
CN101
CN102
CN301
CN303
CN306
CN302
CN304
CN305 (Y)
CN202 (B)
CN201 (W)
CN2
CN3
(N.C) CN307
FRNT PANEL UNIT
THERMAL HEAD
SONY MADE IN JAPAN
LE-11 1-655-126-11
CN521
LE-11 -SOLDERING SIDE-
1-655-126-11
PTC-35
1-655-124-11
SONY
MADE IN JAPAN
CN501
PTC-35 -SOLDERING SIDE-
1-655-124-11
MA-19 -SOLDERING SIDE-
1-655-122-11
SUM3
SE-9 -SOLDERING SIDE-
1-641-592-11
M952
HEAD MOTOR
M951
DOOR MOTOR
DOOR SW
OPEN/CLOSE
1-655-123-11
C-19
SONY
MADE IN JAPAN
CN511
C-19 -SOLDERING SIDE-
1-655-123-11


1
VIDEO IN·····1Vp-p
IC 1 15/16 PIN····0.9Vp-p
2
0.8Vp-p
Q2 C
3
5.5V p-p
IC1 3 PIN
4
4.2V p-p
TP 5
5
6V p-p
Q14 B
6
0.6Vp-p
IC 1 10 PIN
7
1.8Vp-p
TP 1
8
1.52Vp-p
TP4
9
5Vp-p
TP101
10
2Vp-p
TP102 16MHz
11
5.45Vp-p
IC3 7 PIN
IC4 9 PIN

M (POWER SUPPLY) C (SWITCHING REGULATOR) D (DC-DC CONVERTER) I (AC IN)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

A B C D E F G H I J

M BOARD

I BOARD

AC100-120V

F101 250V 4AH

F102 T4AH250V

CN101

LF103

VDR101 NV470D07

250VAC 0.22 C101

S101

V101

LF102

C108 220P 125V/250V

C110 220P 125V/250V

C104 0.22 250VAC

TH101 10D-11

D101 D3SB60

C154 0.47 450V

L2

L1

C122 2200P 125V/250V

C105 2200P 125V/250V

C153 0.47 450V

C130 0.47 450V

R109 820K

R110 820K

L101

R140 0.033 0.33W

D110 DSL60

Q103 2SK2234

C151 180 450V

C152 0.22 630V

R117 820K

R111 47K 2W

R112 47K 2W

R133 820K

R132 820K

R134 820K

R131 0.1 1W

R119 100K 1W

R120 100K 1W

Q101

Q102

C118 1000P

C119 1000P

R113 22K

R114 22K

R115 0.22 2W

R116 0.22 2W

C113 0.015 630V

T101

R129 22

D105 AU02

D104 AU02

D102

D103 HZS30NB

R141 22

R118 33

C115 0.01

C126 100 50V

D201 F25P09DS

D202 F25P09DS

C201 1500 35V

C202 1500 35V

C203 1000P

R236 47 1W

C223 1000P

C205 470 35V

IC301

DC-DC CONVERTER

HA16114

C313 0.1

R315 18KF

C314 47 50V

C315 4.7 50V

C316 6800P

R317 2.2K

R318 390K

R321 220

D304 HZS12EB3

R350 10

C317 47 50V

C312 100P

C311 680P

C322 100P

R311 12KF

R312 100K

R320 0.1 1W

R350 0.1 1W

D302 HZS6.2NB

L301 50uH

L302 10uH

C210

C318 330 10V

C321 470 10V

C207

D303 1SS119

D301 F10P04D

R322 10K F

R331 220K

R330 220K

R323 10K F

C401 0.1

R402 18KF

C402 4.7 50V

C403 4.7 50V

C404 6800P

R401 11KF

R403 2.2K

R404 390K

R407 220

D404 HZS9-1B2

R450 10

R405 0.1 1W

R406 0.1 1W

C407 4700P

R409 100K

C405 47 50V

C411 100P

C408 25V

R410

C410 470 25V

C206

D402 HZS18NB

D401 F10P04D

RV201

L401 50uH

L402 10uH

D1 1SS304

IC101 UPC78N12H

IC102 MC34262 V.F. Input Vcc Comp Multi C.S Z.C.Det OUT GND

R183 47

R184 6.8K

C185 100 25V

C184 0.33 50V

C182 0.01

R182 15K

C181 0.22

RV1 10K

C183 1000P

Q151 2SD774

R181 22K

D610 HZS33B2

IC103 M51945B

R185 47K

R186 100K

R187

C521 0.01

D BOARD

IC201 DUAL OP AMP

D203 HZS30NB

R208 470

R205 10K

R215 33K

C214 0.1

R219 39KF

C207 47 50V

R217 18K F

R210 4.7K

R223 8.2KF

R1 10K

R2 1K

R228 1M

R209 4.7K

R206 4.7K

R207 470

C215 2200P

C210 100 25V

R214 10K

D205 1SS119

D206 HZS5.1NB1

Q202 2SC2785

IC203 HA17431

R250 4.7K F

R251 4.7K F

R3 15K

C211 47 25V

CN201

PH101 PC123

PH102 PC123

C193 0.01

C116 0.01

R107 1K

C IC601 SWITCHING REGULATER

C BOARD

T601

D601 1SEQS04

D602 1SEQS04

R502 4.7K

R504 4.7K

R501 4.7

R503 4.7

Q601 2SB810

Q602 2SB810

C501 470P

C502 470P

R616 2.2K

R619 2.2K

R605 22

C507 0.1

CN103

IC501 CXA8038

R615 3.3K

D507 RB441Q

D506 RB441Q

R641 15K

C515 0.01

C520 0.1

R620 5.6K

R630 4.7K

R617 18K

RV501

C518 0.01

C519 330P

R640 220K

C517 0.1

D503 1SS119

R624 10K

R618 4.7K

D505 HZS9-1B2

Q603 2SD774

Q504 DTC114ES

C512 0.33

CN202

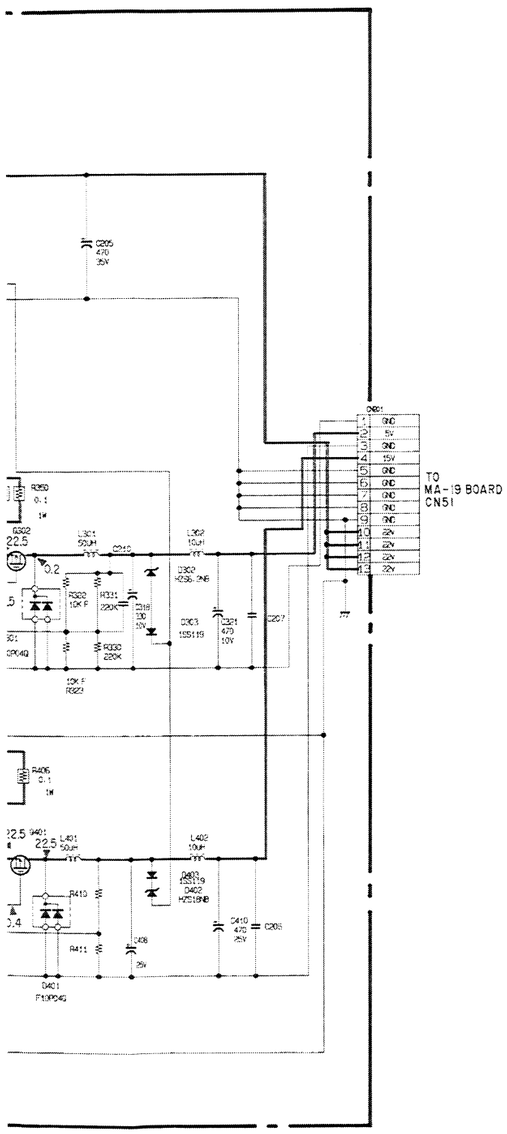
IC203 +22V REG

IC401 DC-DC CONVERTER

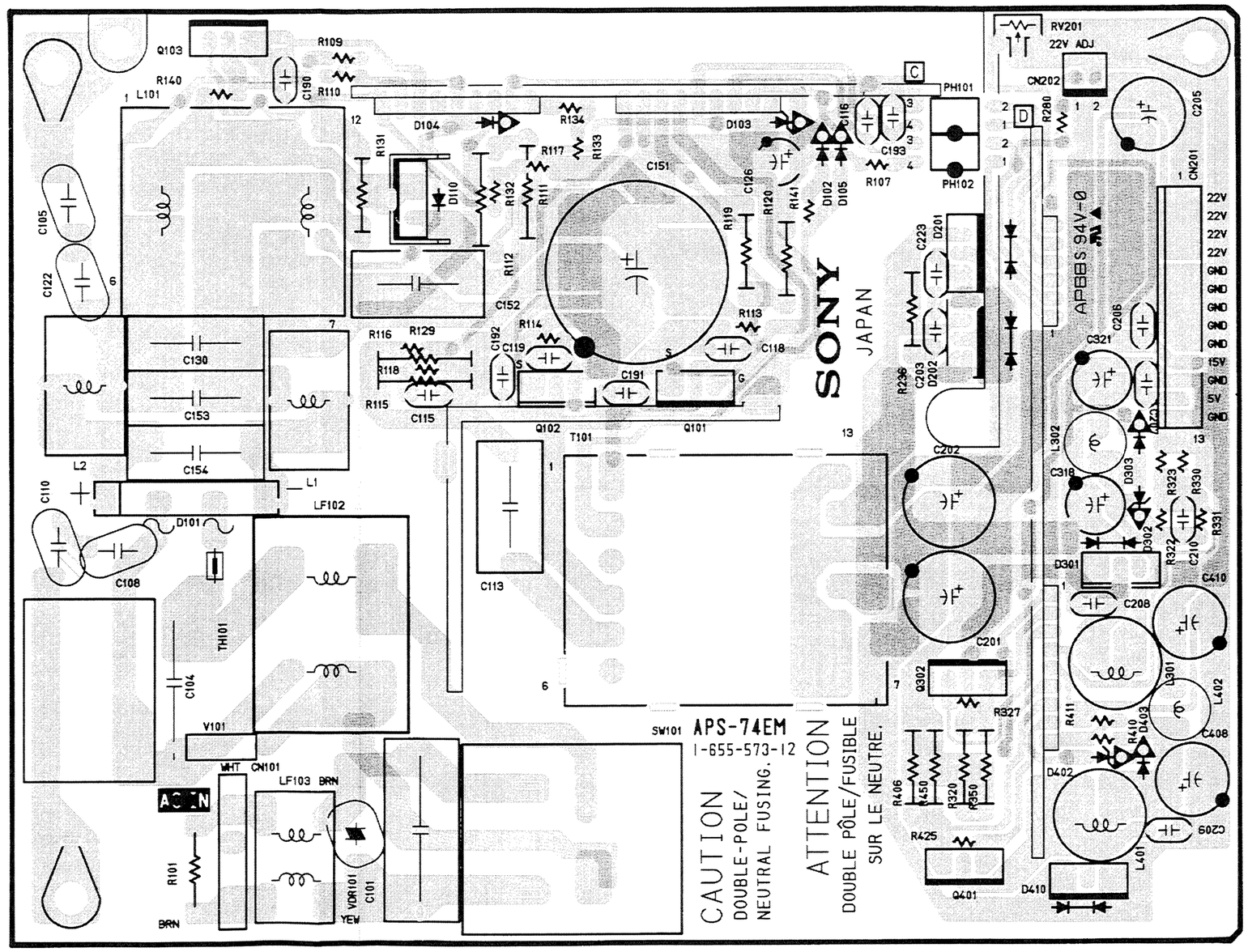
HA15114

R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20 R21 R22 R23 R24 R25 R26 R27 R28 R29 R30 R31 R32 R33 R34 R35 R36 R37 R38 R39 R40 R41 R42 R43 R44 R45 R46 R47 R48 R49 R50 R51 R52 R53 R54 R55 R56 R57 R58 R59 R60 R61 R62 R63 R64 R65 R66 R67 R68 R69 R70 R71 R72 R73 R74 R75 R76 R77 R78 R79 R80 R81 R82 R83 R84 R85 R86 R87 R88 R89 R90 R91 R92 R93 R94 R95 R96 R97 R98 R99 R100

14 | 15 | 16 | 17

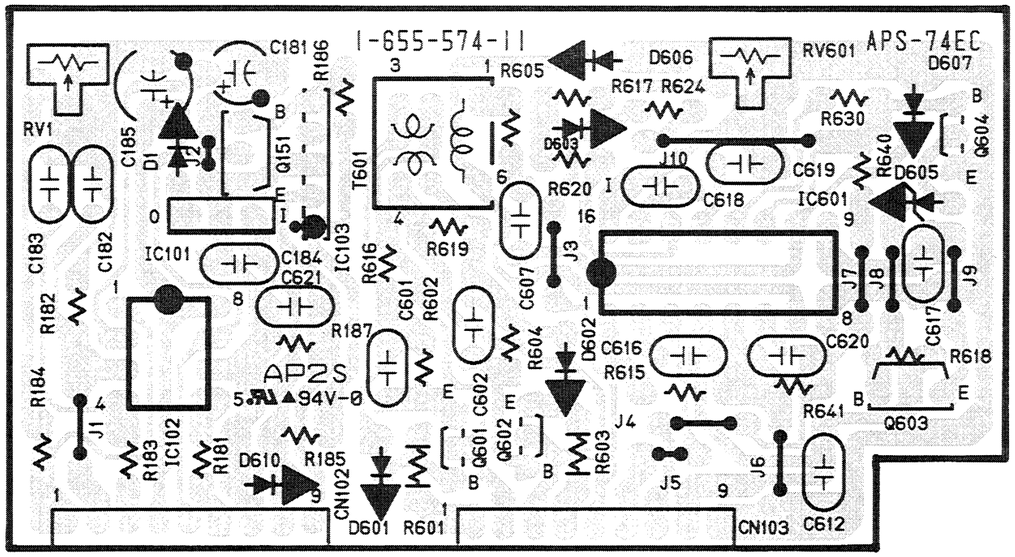


M (POWER SUPPLY)

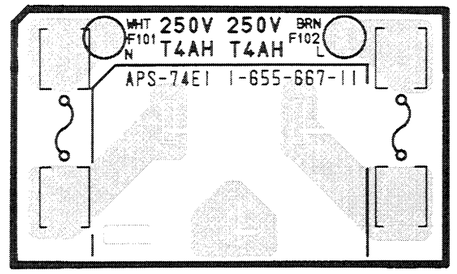


M -SOLDERING SIDE-
1-655-573-12

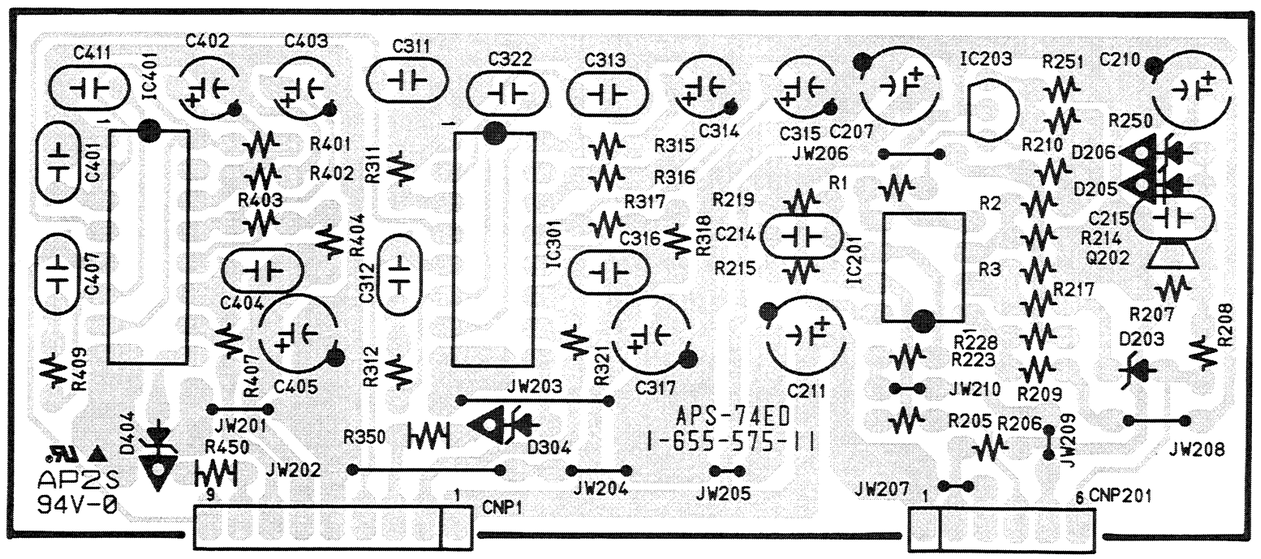
C (SWITCHING REGULATOR) D (DC-DC CONVERTER) I (AC IN)



C -SOLDERING SIDE-
1-655-574-11



I -SOLDERING SIDE-
1-655-667-11



D -SOLDERING SIDE-
1-655-575-11

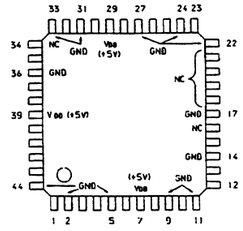
4-4. SEMICONDUCTORS

The chart in this section may sometimes show diodes, transistors, and ICs that are not interchangeable. When replacing a component, be sure to refer to the parts list. The circuit diagram of each IC is obtained from the IC data book published by the manufacturer.

TYPE	PAGE
1SS184	45
2SA1162-G	45
2SB798-DL	45
2SC2712-YG	45
2SD999-CLCK	45
DTA124EK	45
DTC114EK	45
DTC124EK	45
GL-520	45
GP2S40K	45
PT493F	45
PT501A	45
CXD8932Q	40
CXD8938Q	40
CXP80P116Q-2-EXP030	41
HA11465A	42
HD14053BFP	42
HM514280AJ-7	42
LM358PS	42
M51970L	43
M54543L	43
M54544AL	43
MB40776PF	43
PST523C	44
SN74HC14ANS	44
SN74HC74ANS	44
TA7812S	44

CXD8932Q (SONY)

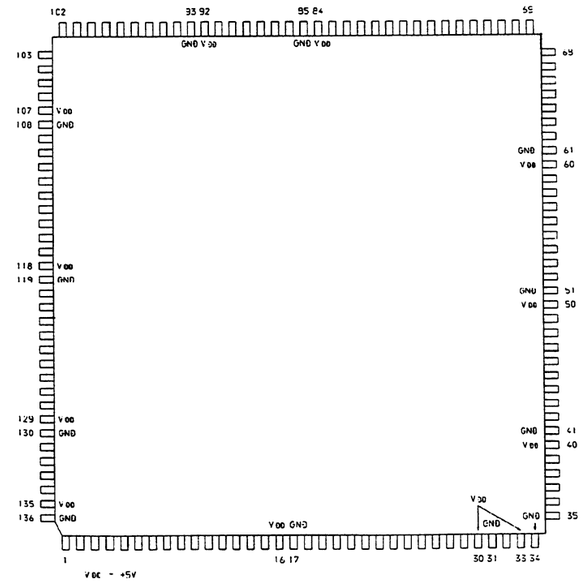
CLOCK OSC
—TOP VIEW—



PIN No.	I/O	SIGNAL	PIN No.	I/O	SIGNAL
1	O	CKO1A	23	O	CKO1B
2	—	GND	24	—	GND
3	I	CK1A	25	I	CK1B
4	O	CKO2A	26	O	CKO2B
5	—	GND	27	—	GND
6	O	HDOA	28	O	HDOB
7	—	VDD	29	—	VDD
8	I	HDSLA	30	I	HDSLB
9	—	GND	31	—	GND
10	I	HDA	32	I	HDB
11	—	GND	33	—	GND
12	O	XT2A	34	—	N.C.
13	I	XT1A	35	I	XT1B
14	—	GND	36	—	GND
15	O	XTOA	37	O	XTOB
16	—	N.C.	38	I	D0
17	—	GND	39	—	VDD
18	—	N.C.	40	I	D1
19	—	N.C.	41	I	D2
20	—	N.C.	42	I	D3
21	—	N.C.	43	I	D4
22	—	GND	44	—	GND

CXD8938Q (SONY)

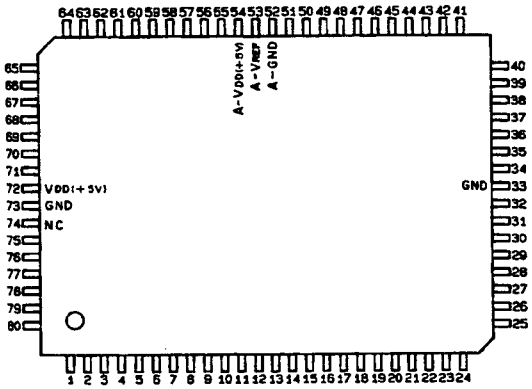
CELL BASE IC
—TOP VIEW—



PIN No.	I/O	SIGNAL	PIN No.	I/O	SIGNAL	PIN No.	I/O	SIGNAL	PIN No.	I/O	SIGNAL
1	I	*CSYNC	35	O	SHTEST	69	I	SCK	103	O	*RAS
2	I	SMROFF	36	I	tCS3	70	I	SI	104	O	*CAS
3	O	EXTH	37	I	tCS2	71	O	HDEAR	105	O	*OE
4	O	EXTV	38	I	tCS1	72	O	*COPYING	106	O	*WE
5	O	ODD	39	I	tCS0	73	I	*STB	107	—	VDD
6	I	MCK	40	—	VDD	74	I	OR1	108	—	GND
7	I	DCKI	41	—	GND	75	I	*COPY	109	O	D1017
8	I	DCKSEL	42	O	PWM0	76	I	*COPYSTOP	110	O	D1016
9	I	HDO	43	O	PWM1	77	I	*FETC4	111	O	D1015
10	O	DCKO	44	O	PWM2	78	I	*FTCSTOP	112	O	D1014
11	O	DITH0	45	O	PWM3	79	I	*MRGGNCSET	113	O	D1013
12	O	DITH1	46	O	PWM4	80	I	REGSEL	114	O	D1012
13	I	AD15	47	O	PWM5	81	I	*RSTLD	115	O	D1011
14	I	AD14	48	O	PWM6	82	I	MEGA	116	O	D1010
15	I	AD13	49	O	PWM7	83	I	*CLR	117	O	D109
16	—	VDD	50	—	VDD	84	—	VDC	118	—	VD9
17	—	GND	51	—	GND	85	—	GNC	119	—	GN9
18	I	AD12	52	O	PWM8	86	I	tAD5	120	O	D108
19	I	AD11	53	O	PWM9	87	I	tAD4	121	O	D107
20	I	AD10	54	O	PWM10	88	I	tAD3	122	O	D106
21	I	FTCTEST	55	O	PWM11	89	I	tAD2	123	O	D105
22	I	FTCOTEST	56	O	PWM12	90	I	tAD1	124	O	D104
23	I	TEST-	57	O	PWM13	91	I	tAD0	125	O	D103
24	I	TESTV	58	O	PWM14	92	—	VD8	126	O	D102
25	I	TESTOD0	59	O	PWM15	93	—	GN0	127	O	D101
26	I	CPTEST1	60	—	VD0	94	O	DA08	128	O	D100
27	I	CPTEST0	61	—	GN0	95	O	DA07	129	-	VD0
28	I	*TCSTINTV	62	O	TMCK	96	O	DA06	130	—	GN0
29	I	SNCTEST	63	O	DROUT	97	O	DA05	131	I	tWE
30	—	VDD	64	O	*STBOUT	98	O	DA04	132	I	tOE
31	—	GND	65	I	*FG1	99	O	DA03	133	I	tRW
32	I	RAMTEST	66	I	*FG2	100	O	DA02	134	I	tLCSEL
33	—	VDU	67	O	*FGOUT	101	O	DA01	135	—	VD0
34	—	GND	68	O	*INTV	102	O	DA00	136	—	GN0

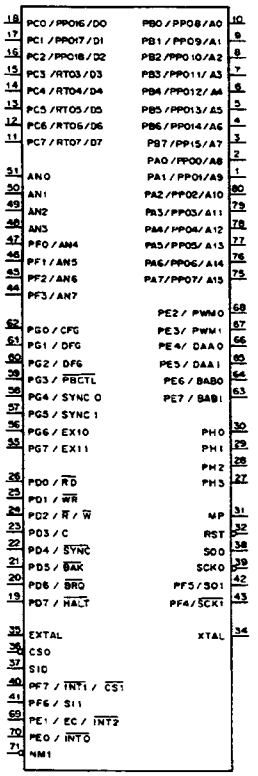
CXP80P116Q-2-EXP030

C-MOS 8-BIT MICROCOMPUTER
—TOP VIEW—



(V_{DD} = +5V)

PIN NO.	I/O	SYMBOL	PIN NO.	I/O	SYMBOL
1	O	PA1/PPO1/A9	41	I	PF6/SI1
2	O	PA0/PPO0/A8	42	I/O	PF5/SO1
3	O	PB7/PPO15/A7	43	I,I/O	PF4/SCK1
4	O	PB6/PPO14/A6	44	I	PF3/AN7
5	O	PB5/PPO13/A5	45	I	PF2/AN6
6	O	PB4/PPO12/A4	46	I	PF1/AN5
7	O	PB3/PPO11/A3	47	I	PF0/AN4
8	O	PB2/PPO10/A2	48	I	AN3
9	O	PB1/PPO9/A1	49	I	AN2
10	O	PB0/PPO8/A0	50	I	AN1
11	I/O,O,I/O	PC7/RTO7/D7	51	I	AN0
12	I/O,O,I/O	PC6/RTO6/D6	52	–	A-GND
13	I/O,O,I/O	PC5/RTO5/D5	53	–	A-VREF
14	I/O,O,I/O	PC4/RTO4/D4	54	–	A-VDD
15	I/O,O,I/O	PC3/RTO3/D3	55	I	PG7/EXI1
16	I/O,O,I/O	PC2/PPO18/D2	56	I	PG6/EXI0
17	I/O,O,I/O	PC1/PPO17/D1	57	I	PG5/SYNC1
18	I/O,O,I/O	PC0/PPO16/D0	58	I	PG4/SYNC0
19	I/O,O	PD7/$\overline{HALT}$	59	I	PG3/PBCTL
20	I/O,O	PD6/$\overline{BRQ}$	60	I	PG2/DPG
21	I/O,O	PD5/$\overline{BAK}$	61	I	PG1/DFG
22	I/O,O	PD4/$\overline{SYNC}$	62	I	PG0/CFG
23	I/O,O	PD3/C	63	O	PE7/DAB1
24	I/O,O	PD2/R/$\overline{W}$	64	O	PE6/DAB0
25	I/O,O	PD1/$\overline{WR}$	65	O	PE5/DAA1
26	I/O,O	PD0/$\overline{RD}$	66	O	PE4/DAA0
27	O	PH3	67	O	PE3/PWM1
28	O	PH2	68	O	PE2/PWM0
29	O	PH1	69	I	PE1/EC/$\overline{INT2}$
30	O	PH0	70	I	PE0/$\overline{INT0}$
31	I	MP	71	I	NMI
32	I/O	RST	72	–	VDD
33	–	GND	73	–	GND
34	O	XTAL	74	–	NC
35	I	EXTAL	75	O	PA7/PPO7/A15
36	I	CS0	76	O	PA6/PPO6/A14
37	I	SI0	77	O	PA5/PPO5/A13
38	O	SO0	78	O	PA4/PPO4/A12
39	I/O	SCK0	79	O	PA3/PPO3/A11
40	I	PF7/$\overline{INT1}$/$\overline{CS1}$	80	O	PA2/PPO2/A10


18 PC0 / PPO16 / D0
17 PC1 / PPO17 / D1
16 PC2 / PPO18 / D2
15 PC3 / RTO3 / D3
14 PC4 / RTO4 / D4
13 PC5 / RTO5 / D5
12 PC6 / RTO6 / D6
11 PC7 / RTO7 / D7
51 AN0
50 AN1
49 AN2
48 AN3
47 PF0 / AN4
46 PF1 / AN5
45 PF2 / AN6
44 PF3 / AN7
62 PG0 / CFG
61 PG1 / DFG
60 PG2 / DPG
59 PG3 / PBCTL
58 PG4 / SYNC 0
57 PG5 / SYNC 1
56 PG6 / EXI0
55 PG7 / EXI1
26 PD0 / RD
25 PD1 / WR
24 PD2 / R / W
23 PD3 / C
22 PD4 / SYNC
21 PD5 / BAK
20 PD6 / BRQ
19 PD7 / HALT
33 EXTAL
36 CS0
37 SI0
40 PF7 / INT1 / CS1
41 PF6 / SI1
69 PE1 / EC / INT2
70 PE0 / INT0
71 NMI
10 PB0 / PPO8 / A0
9 PB1 / PPO9 / A1
8 PB2 / PPO10 / A2
7 PB3 / PPO11 / A3
6 PB4 / PPO12 / A4
5 PB5 / PPO13 / A5
4 PB6 / PPO14 / A6
3 PB7 / PPO15 / A7
2 PA0 / PPO0 / A8
1 PA1 / PPO1 / A9
80 PA2 / PPO2 / A10
79 PA3 / PPO3 / A11
78 PA4 / PPO4 / A12
77 PA5 / PPO5 / A13
76 PA6 / PPO6 / A14
75 PA7 / PPO7 / A15
68 PE2 / PWM0
67 PE3 / PWM1
66 PE4 / DAA0
65 PE5 / DAA1
64 PE6 / DAB0
63 PE7 / DAB1
30 PH0
29 PH1
28 PH2
27 PH3
31 MP
32 RST
38 SO0
39 SCK0
42 PF5 / SO1
43 PF4 / SCK1
34 XTAL

INPUT

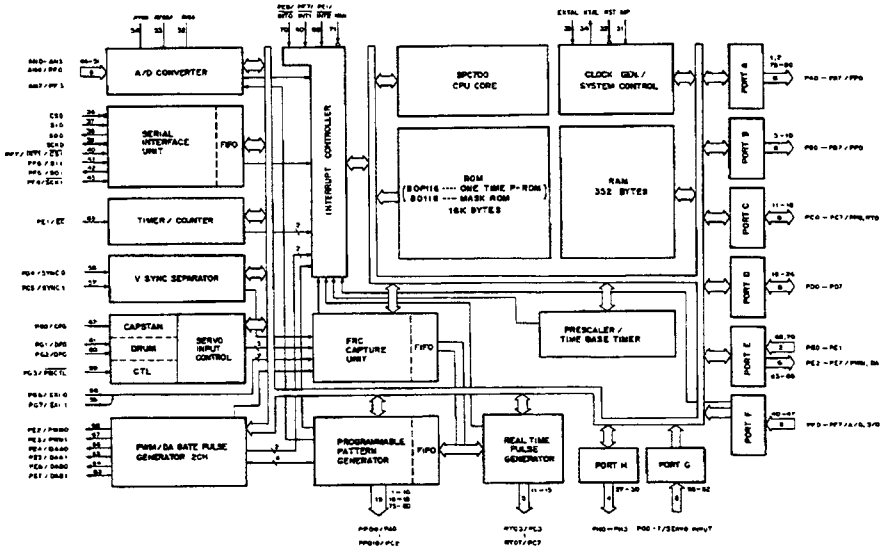
AN0 – AN7	: ANALOG INPUTS
BRQ	: BUS REQUEST INPUT
CFG	: CAPSTAN FG INPUT
CS0,1	: CHIP SELECT INPUTS
DFG	: DRUM FG INPUT
DPG	: DRUM PG INPUT
EC	: EVENT INPUT
EXI0,1	: EXTERNAL INPUTS
EXTAL	: SYSTEM CLOCK GENERATE JOINT
HALT	: CPU STOP INPUT
INT0 – INT2	: EXTERNAL OFFERING INPUTS
MP	: MICRO PROSESSOR MODE INPUT
NMI	: NONMASKABLE OFFERING INPUT
PBCTL	: PB CTL PULSE INPUT
PE0,1	: PORT E INPUTS
PF0 – PF7	: PORT F INPUTS
PG0 – PG7	: PORT G INPUTS
SI0,1	: SERIAL DATA INPUTS
SYNC0,1	: COMPOSITE SYNC INPUTS

OUTPUT

A0 – A15	: ADDRESS BUS OUTPUTS
BAK	: BUS ACKNOWLEGE OUTPUT
C	: TIMING SIGNAL OUTPUT
DAA0,1	: DA GATE PULSE OUTPUTS
DAB0,1	: DA GATE PULSE OUTPUTS
PA0 – PA7	: PORT A OUTPUTS
PB0 – PB7	: PORT B OUTPUTS
PE2 – PE7	: PORT E OUTPUTS
PH0 – PH3	: PORT H OUTPUTS
PPO0 – PPO18	: PROGRAMMABLE PATTERN GENERATOR OUTPUTS
PWM0,1	: PWM OUTPUTS
R/W	: CPU MACHINE SYCLE
RD	: READ
RTO3 – RTO7	: REAL TIME PULSE OUTPUTS
SO0,1	: SERIAL DATA OUTPUTS
SYNC	: SYNC
WR	: WRITE
XTAL	: SYSTEM CLOCK GENERATER OUTPUT

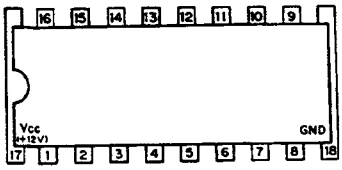
INPUT/OUTPUT

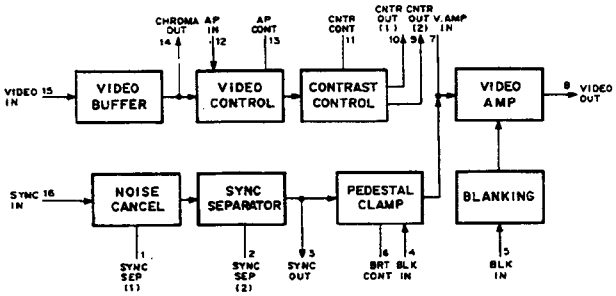
D0 – D7	: DATA BUS
PC0 – PC7	: PORT C
PD0 – PD7	: PORT D
RST	: RESET
SCK0,1	: SERIAL CLOCK



HA11465A

NTSC COLOR TV VIDEO AMPLIFIER
—TOP VIEW—

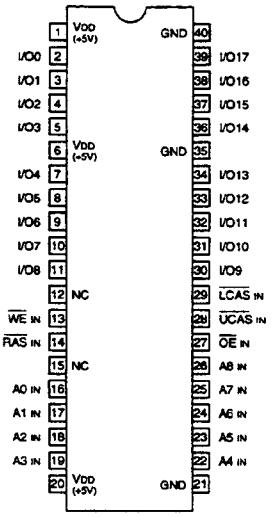


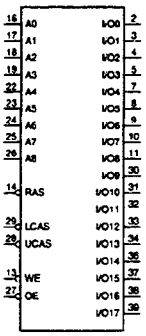


AP ; APERTURE
BLK ; BLANKING
BRT ; BRIGHTNESS
CNTR ; CONTRAST
CONT ; CONTROL
SYNC SEP ; SYNCHRONIZATION PULSE SEPARATION
V.AMP ; VIDEO AMPLIFIER

HM514280AJ-7

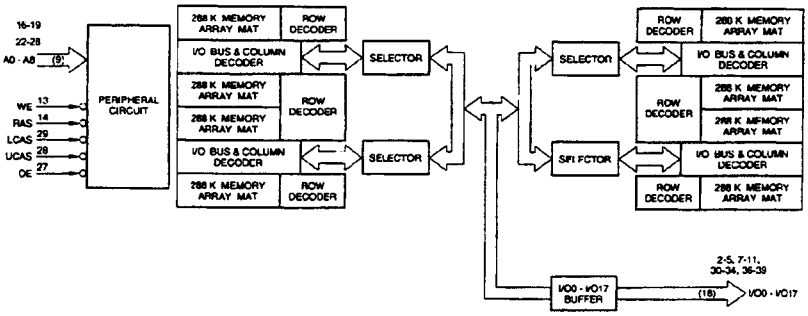
C-MOS 4M (262144Wx18)-BIT DYNAMIC RAM
—TOP VIEW—





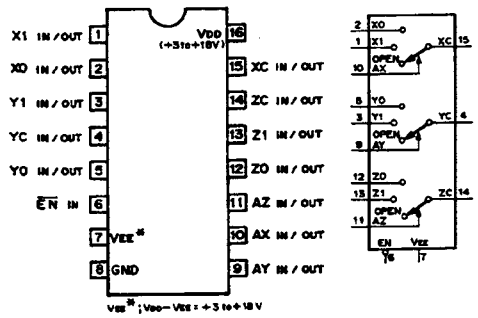
INPUT
A0 - A8 ; ADDRESS (ROW/REFRESH: A0 - A8, COLUMN: A0 - A8)
$\overline{LCAS}$; COLUMN ADDRESS STROBE
$\overline{OE}$; OUTPUT ENABLE
$\overline{RAS}$; LOW ADDRESS STROBE
$\overline{UCAS}$; COLUMN ADDRESS STROBE
$\overline{WE}$; REED/WRITE INPUT

INPUT/OUTPUT
I/O0 - I/O17 ; DATA INPUT/OUTPUT



HD14053BFP (HITACHI) FLAT PACKAGE

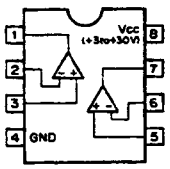
C-MOS TRIPE 2-CHANNEL ANALOG MULTIPLEXERS/DEMULTIPLEXERS
—TOP VIEW—



CONT. INPUTS		ON
EN	A (X,Y,Z)	CHANNEL
0	0	0
0	1	1
1	X	OPEN

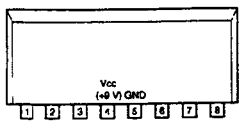
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE.

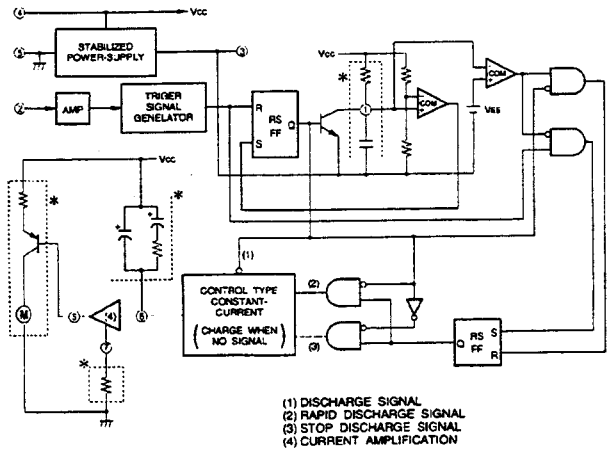
LM358PS (TI) FLAT PACKAGE



M51970L (MITSUBISHI)

MOTOR SPEED CONTROL
—SIDE VIEW—



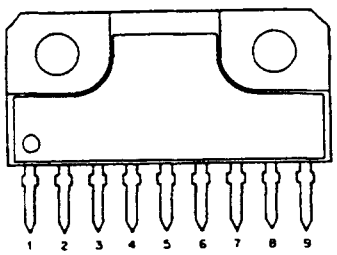


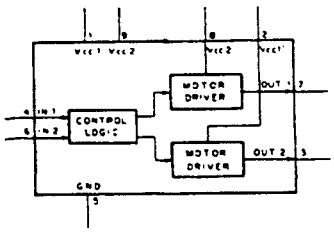
(1) DISCHARGE SIGNAL
(2) RAPID DISCHARGE SIGNAL
(3) STOP DISCHARGE SIGNAL
(4) CURRENT AMPLIFICATION

Note:
1. C mark is pin number.
2. * The areas with dotted line mean the parts installed out side.

M54543L (MITSUBISHI)

BI-DIRECTIONAL MOTOR DRIVER
—SIDE VIEW—



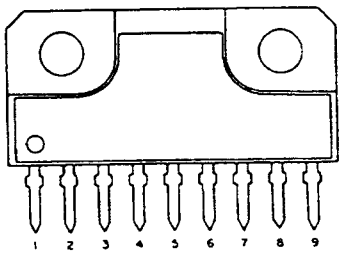


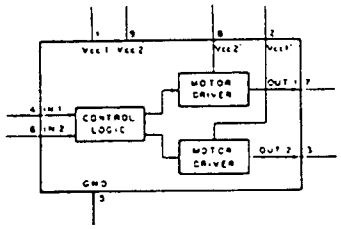
IN		OUT		MODE
1	2	1	2	
0	0	Z	Z	NO OPERATION
1	0	1	0	ROTATION
0	1	0	1	REVERSE ROTATION
1	1	0	0	BRAKE

0 : LOW LEVEL
1 : HIGH LEVEL
Z : HIGH IMPEDANCE

M54544AL (MITSUBISHI)

BI-DIRECTIONAL MOTOR DRIVER
—SIDE VIEW—



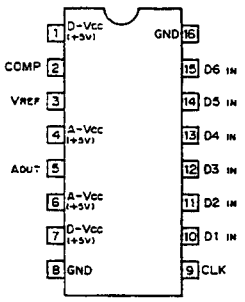


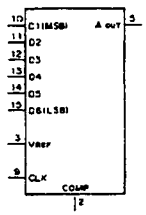
IN		OUT		MODE
1	2	1	2	
0	0	Z	Z	NO OPERATION
1	0	1	0	ROTATION
0	1	0	1	REVERSE ROTATION
1	1	0	0	BRAKE

0 : LOW LEVEL
1 : HIGH LEVEL
Z : HIGH IMPEDANCE

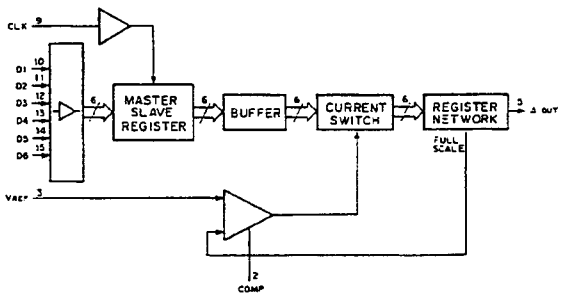
MB40776PF

6-BIT VIDEO D/A CONVERTER
—TOP VIEW—



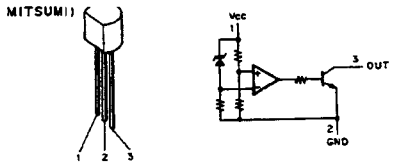


AOUT ; ANALOG OUTPUT
CLK ; CLOCK INPUT
COMP ; COMPENSATION
D1-D6 ; DIGITAL INPUTS
VREF ; REFERENCE VOLTAGE INPUT



PST523C (MITSUMI) 4.5V

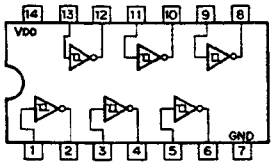
SYSTEM RESETTING DEVICE

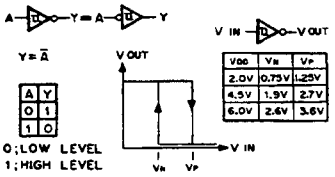


REF.; REFERENCE VOLTAGE

SN74HC14ANS (TI) FLAT PACKAGE

C-MOS HEX SCHMITT TRIGGER INVERTERS
—TOP VIEW—





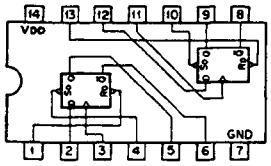
VDD	VH	VP
2.0V	0.75V	1.25V
4.5V	1.9V	2.7V
6.0V	2.6V	3.6V

NOTE :

TYPE	VDD
TC74AC/VHC	+2 to +5.5V
OTHER TYPES	+2 to +6V

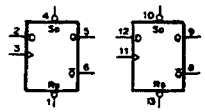
SN74HC74ANS (TI) FLAT PACKAGE

C-MOS DUAL D-TYPE FLIP-FLOPS WITH DIRECT SET/RESET
—TOP VIEW—



INPUTS				OUTPUTS	
$\overline{S_D}$	$\overline{R_D}$	CK	D	Qn+1	$\overline{Q_{n+1}}$
0	1	X	X	1	0
1	0	X	X	0	1
0	0	X	X	1	1
1	1	↑	1	1	0
1	1	↑	0	0	1
1	1	0	X	Qn	$\overline{Q_n}$

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

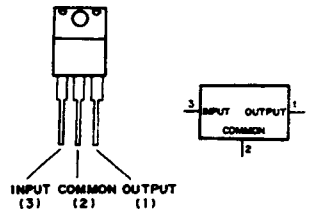


NOTE :

TYPE	VDD
HCT/ACT	+5V
TC74AC/VHC	+2 to +5.5V
OTHERS	+2 to +6V

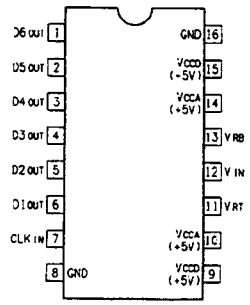
TA7812S (TOSHIBA) + 12V (1 A)

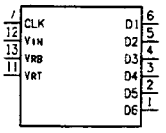
POSITIVE VOLTAGE REGULATOR
—FRONT VIEW—

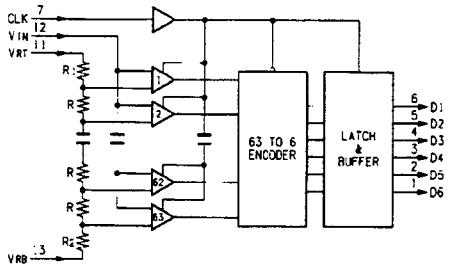


TL5501CDWA (TI)

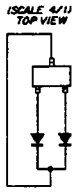
6-BIT A/D CONVERTER
—TOP VIEW—



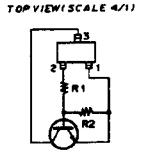




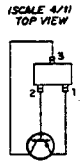
1SS184



DTC114EK
DTC124EK



2SA1162-G



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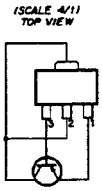
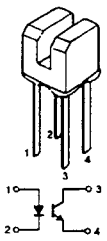
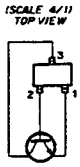
2SB798-DL



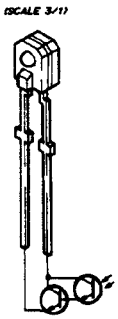
GP2S40K



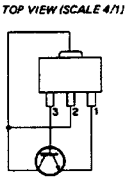
2SC2712-YG



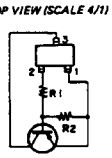
PT493F



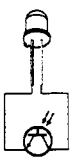
2SD999-CLCK



DTA124EK



PT501A



SECTION 5
CIRCUIT DESCRIPTION

5-1. VIDEO CIRCUIT

5-1-1. Operation

A composite video signal is input from the BNC connector(CN1-(VIDEO-IN)) to the MA-19 board. The composite video signal is terminated with 75 ohms by R1 and R2 when the DIP switch (S302-⑫) is set to ON. The signal then passes through the input buffer and branches into three routes. Two of these three signals are input through trap circuit 1 (FL1 for NTSC signal) and trap circuit 2 (FL2 for PAL signal) to the analog switch (IC2-③⑤) and selected in accordance with the NTSC or PAL judgment of a microcomputer. The automatically selected signal and the signal supplied directly to the input buffer are input to the analog switch (IC2-⑫⑬). An original signal is selected when the DIP switch (S302-⑪) is set to ON. A luminance signal (Y signal) from which the color subcarrier signal has been extracted by the trap circuit is selected when it is set to OFF. The selected signal is input through the buffer to IC1-⑮⑯.

IC1 (1) extracts the C sync signal, (2) emphasizes the picture, and (3) adjusts the contrast. The extracted C sync signal is output from IC1-③. The degree of the picture emphasis does not change because the value of the DC voltage input to IC 1-⑬ is fixed. The signal gain is controlled by changing the DC voltage value at IC 1-⑪ with the CONT control on the front panel. The gain of the video signal output from IC1-⑩ is adjusted with RV1. The dither signal output from IC103-⑪⑫ is injected into the gain-adjusted signal. The signal is then band-limited using a low-pass filter and passed through the clamping circuit. The clamp level at that time is determined by RV2 and the BRT control on the front panel.

The video signal is then input to the analog-digital converter (IC3-⑫) and converted into 6-bit digital data.

The sampling clock for the analog-digital converter is the 18.432 MHz clock output from IC103-⑩. The converted digital data is sent to frame memory (IC104) and digital-analog converter IC4 and reconverted into analog data. The resultant signal is output from IC4-⑤. Since this signal lacks a sync signal, the sync signal is injected by analog switch IC2. An original signal supplied directly to CN1-(VIDEO IN) is output from CN1-(VIDEO OUT).

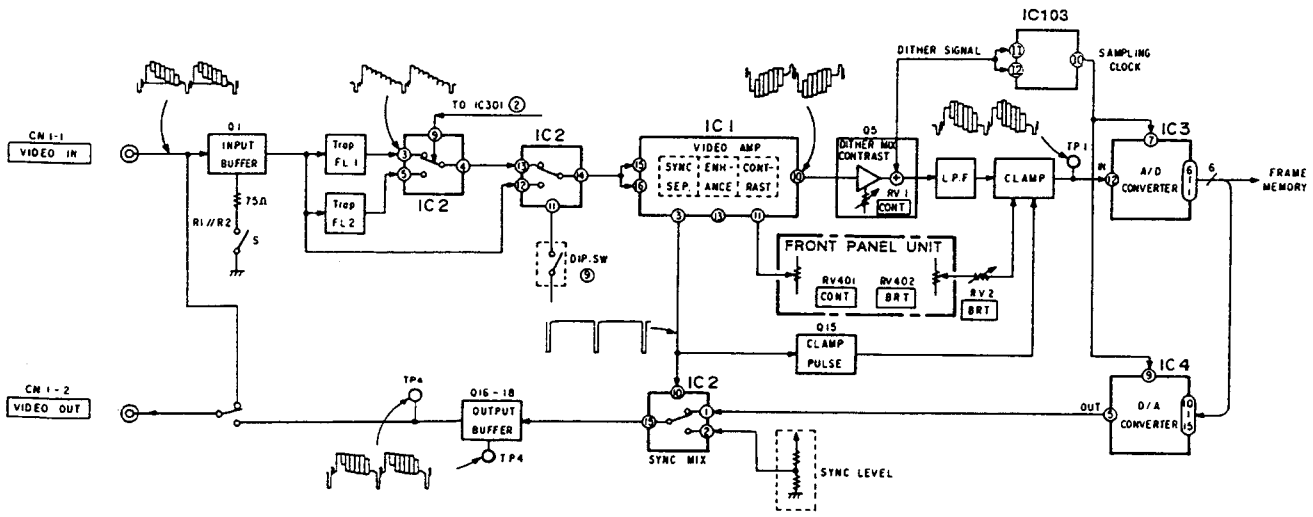
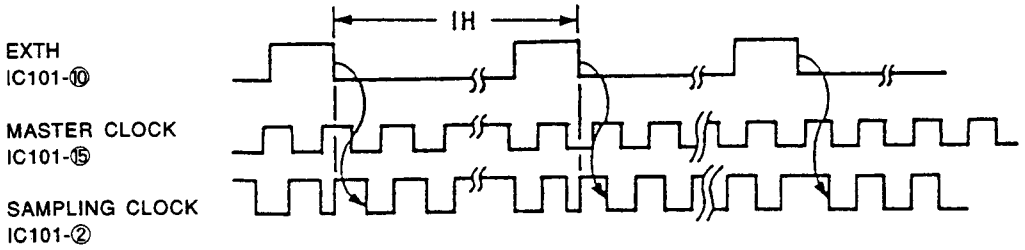


Fig.5-1. Video Signal Processing Section Block Diagram

5-2. OSCILLATION CIRCUIT

An external crystal oscillator is connected to IC101, so the master clock is output from Pin ① and the sampling clock is output from Pin ⑤. Both these clocks are 18.432 MHz, but the phase of the sampling clock is matched at the falling edge of the EXTH signal input to Pin ⑩. (See the figure below.)



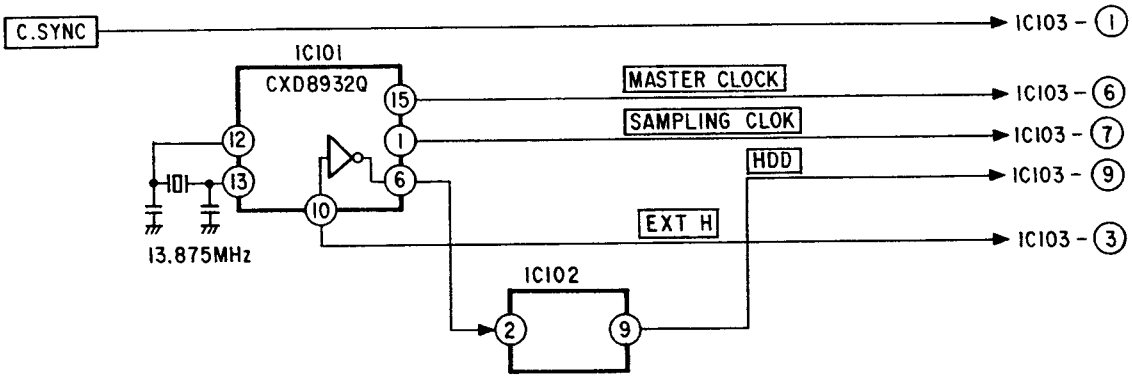


Fig.5-2 Clock Timing Chart and Circuit Diagram.

5-3. PERIPHERAL CIRCUIT IC103

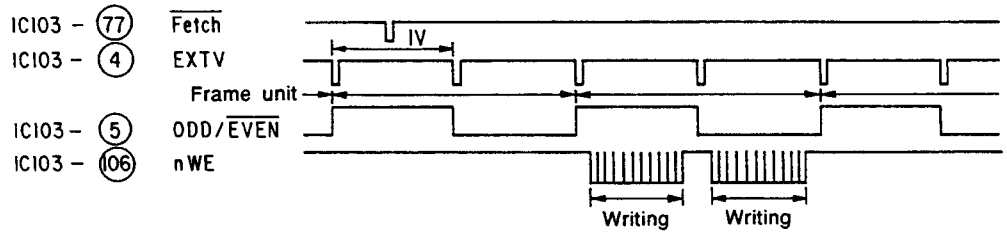
IC103 consists of the following blocks.
(1) Operation coefficient memory (for variable power operation of picture)
(2) Storage register of serial data from CPU (for mode setting)
(3) Frame memory write and read control
(4) 1-line print timing pulse generation
(5) Thermal head control
(6) Dither signal generation
(7) Sync signal processing circuit
(8) 1-line memory
(9) Picture variable power operation circuit
The operation of each block is determined by the serial data from a CPU and the mode selection pin.

5-3-1. Operation Description

(1) Write in operation coefficient memory
A CPU writes 128-byte coefficient data requires for the variable power operation of a picture in the operation coefficient memory inside IC103. This operation is performed only once during the power-on sequence.

(2) Mode setting
A CPU transfers serial data of 112 bits to the shift register in IC103 when it judges the status of DIP switch S302. The modes of each block in IC103 are set by this data.

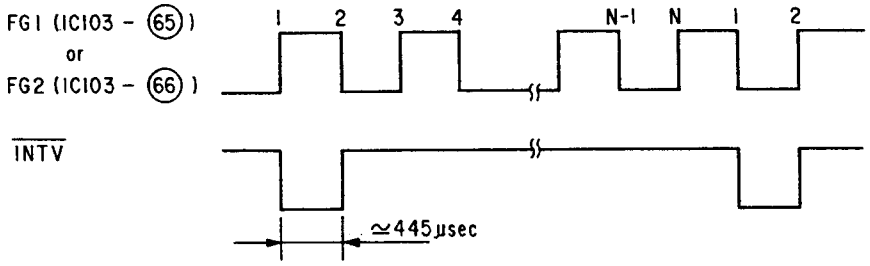
(3) Write in frame memory
When a $\overline{\text{Fetch}}$ pulse is input from the CPU to pin ⑦⑦ of IC103, the next data of one frame is written in frame memory. At that time, the nWE signal at pin ⑩⑥ of IC103 changes as shown below.



(4) Print timing pulse generation

A print timing pulse ($\overline{\text{INTV}}$) for every line is produced by decrementing the rising and falling edges of two FG pulses FG1 or FG2 of a DC motor servo. FG pulses FG1 and FG2, and decrement count "N" are set by the serial data from a CPU. By changing the FG pulses and decrement count, the print period changes and the print line pitch also changes because the motor speed is constant.

The print timing pulse ($\overline{\text{INTV}}$) is used for the detection of CPU motor speed as well as print timing. The CPU judges the motor speed from the period of the $\overline{\text{INTV}}$ pulse and stops the motor when it detects abnormality.



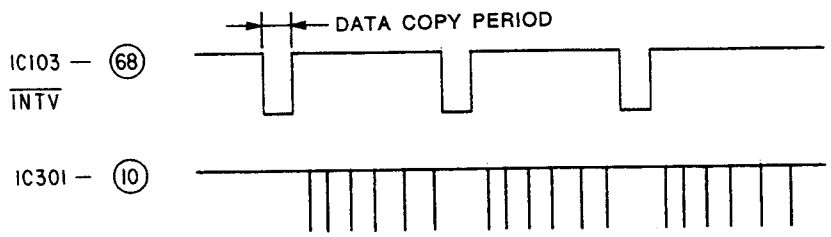
	STD		SIDE	
	NTSC	PAL	NTSC	PAL
Normal	FG2, N=12	FG2, N=10	FG1, N=10	FG1, N=10
Small	FG2, N=12	FG2, N=10	FG1, N=10	FG1, N=10
Zoom 1.5×	FG2, N= 9	FG1, N= 7	FG2, N= 8	FG2, N= 8
Zoom 2×	FG2, N=12	FG2, N=10	FG1, N=10	FG1, N=10

(5) Transfer from frame memory to line memory

When a $\overline{\text{COPY}}$ pulse is input from the CPU, IC103 sets $\overline{\text{COPYING}}$ low and enters the print operation state. To ensure printing, the one-line data selected out of frame memory must be transferred to the one-line memory incorporated in IC103.

The frame memory consists of two field memories that are classified into odd and even fields. IC103 reads necessary print data from the frame memory in the order corresponding to the print range and direction specified for mode setting by the CPU and transfers the data to the one-line memory in IC103 after variable power processing.

Data is transferred for every INTV pulse during low period.

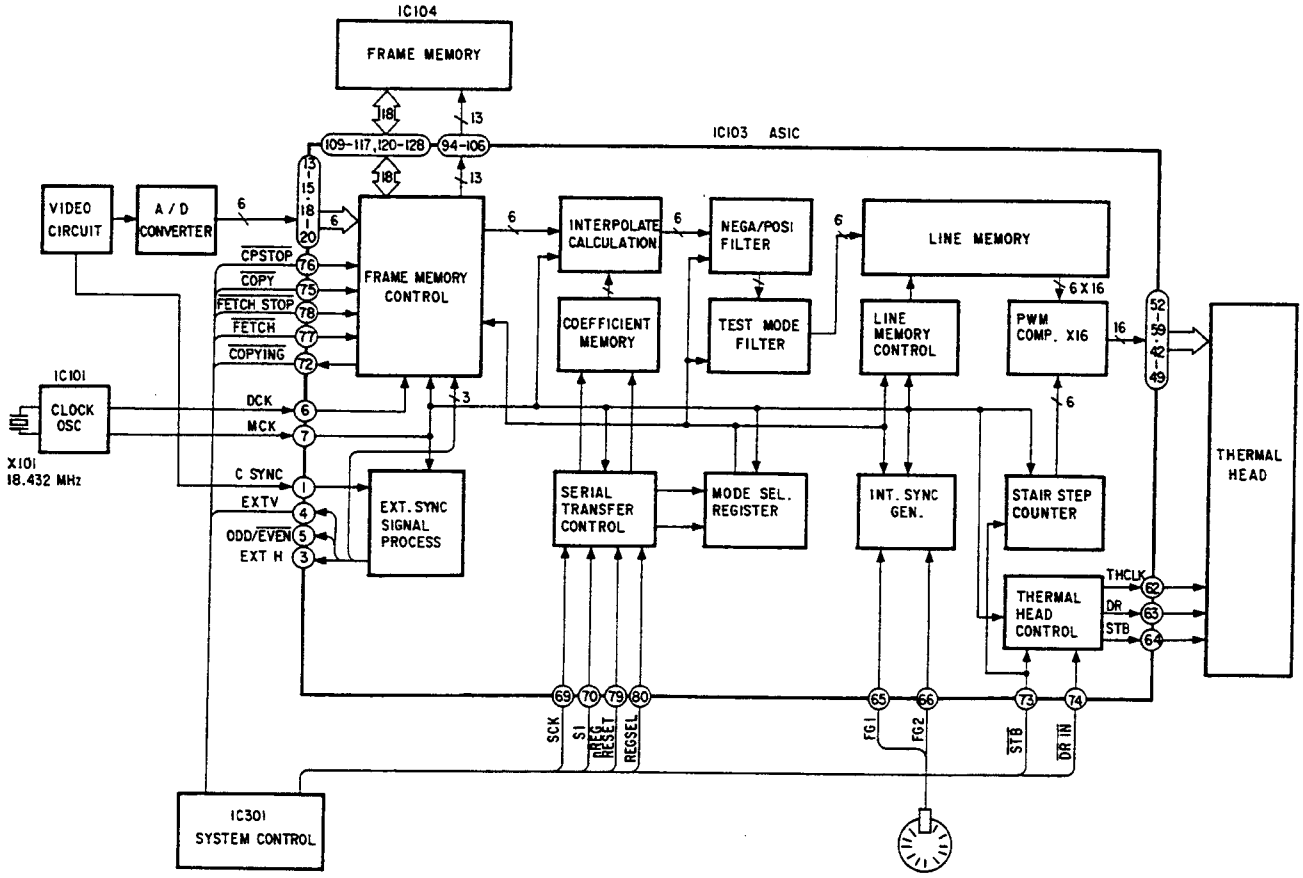


(6) Read from one-line memory

Data is read from one-line memory while an $\overline{\text{INTV}}$ pulse is high. When an $\overline{\text{STB}}$ pulse is input to pin ⑬ of IC103 from the CPU, IC102 initiates the read operation from the one-line memory and is compared with a gradation counter. The comparison result is converted from serial to parallel, sent to the thermal head, and latched in the thermal head using a next $\overline{\text{STB}}$ pulse. When a $\overline{\text{DR}}$ signal is output from the CPU, the thermal head is turned on according to the latched data. This read operation is repeated 64 times while an INTV pulse is high. One-line printing is then completed.

(7) Printing completion

A CPU sets the print start coordinates and print end coordinates by serial data. When the printing in the set range is completed, IC103 sets $\overline{\text{COPYING}}$ high again and notifies the CPU that one-screen printing is completed.



5-4. SYSTEM CONTROL SECTION

PRINT preparations

(i) Turn on the power and check that the POWER LED lights .

(ii) Set paper in place, close the door, and check that the PAPER EMPTY LED goes off.

(iii) Check that the Video signal (EIA or CCIR) is input to the VIDEO INPUT terminal.

* Note 1 : When the paper is set in place. IC301−⑰"L" IC301−⑱"H" This condition is met, IC301 switches off PAPER EMPTY-LED. (IC301-⑩)

* Note 2 : IC301-㉜ is the reset terminal. When the power is first turned on, this pin is held low for a few msec, then set high to end the reset.

5-4-1. Memory write (FETCH) signals from the print key

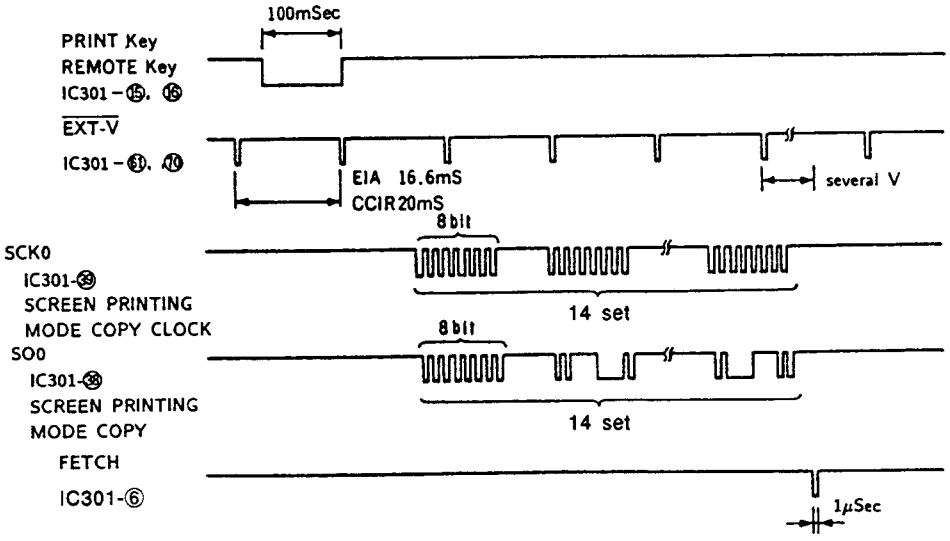


Fig. 5-4. Memory write timing chart

Operation

(i) When the PRINT key or REMOTE key signal is "L" for about 100 msec, the system enters PRINT MODE.

(ii) When the system enters PRINT mode, first it verifies $\overline{\text{EXT-V}}$, then it judges whether the format is EIA or CCIR.

(iii) Once the video format has been judged, the screen print mode data for that format is transferred to IC103-⑩, the SI (serial input) terminal, from the SO0 (serial output) terminal sysnchronized with the SCK0 (serial clock). This data is eight sets of 8 bits each for a total of 14 set (112 data) bits.

(iv) A few EXT-V pulses after the data transfer is complete, the memory write timing signal (FETCH) is output. The timing is taken from IC103 and the video signal is recorded into the video memory, IC104.

5-4-2. From memory writing till screen printing

[I] From after memory writing till the $\overline{\text{INT-V}}$ pulse measurement.

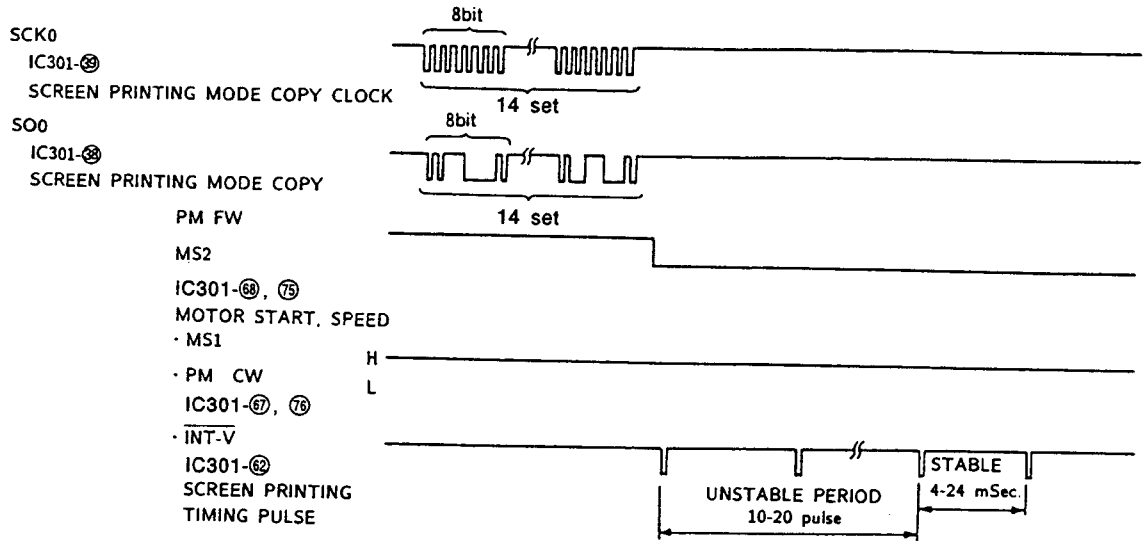


Fig. 5-5. Timing from memory writing till printing

Operation

The data input to the video memory (IC104) with the print key operation is printed with the following procedures :

*Note 1 : The copy key operation is triggered if the copy key is set "L" for at least 100 msec before this operation.

*Note 2 : This operation only occurs if a video signal is input to the video memory.

(i) Turn the Head U/D motor (IC301-㊸, ㊹ : "H","L") and check that the Head goes down(IC301-㊾, ㊿ : "L","H"). Then stop the motor(IC301-㊸, ㊹ : "H","H") When the post feed is ON, rewind the paper simultaneously. Turn the platen motor in reverse (IC301-㊼, ㊽ : "L","H") to return to the specified position, then stop the platen motor (IC301-㊼, ㊽ : "H","H").

(ii) In order to specify the output format for the data from video memory, it is synchronized with the signal at the SCK0 terminal and the data is copied from the SO0 terminal to IC103-⑩ (SI terminal).

(iii) When the data transfer is complete, the motor is rotated, $\overline{\text{INT-V}}$ is generated from IC103-㊽, and input to IC301-㊷. The operations of the PM FW (IC301-㊽), PM CW (IC301-㊼), MS1 (IC301-㊻), and MS2 (IC301-㊺) signals are as follows :

PM FW, PM CW · · · · Turn $\overline{\text{ON}}$/OFF the platen motor (forward, reverse)

MS1, MS2 · · · · · Switches HIGH/LOW of the platen motor speed, between 2 to 4 speed.

Here are the terminal states for each mode.

	PM FW	PM CW	MS1	MS2
STOP	H	H	H	H
3 : 4	L	H	H	L
1 : 1	L	H	L	H
Fast forward	L	H	L	H
Rewind	H	L	L	H

* Note: Since $\overline{\text{INT-V}}$ is made by counting down the FG frequency for the motor servo, if the motor is not turning, it is not output.

(iv) When the platen motor is turning and the FG pulses are input to IC103-⑮,⑯, $\overline{\text{INT-V}}$ is output from IC301-⑱, and input to IC301-⑫. Within IC301, $\overline{\text{INT-V}}$ is measured for about 10 to 20 pulses to ensure that $\overline{\text{INT-V}}$ has a fixed pulse width. After verifying that the pulse period is 4 to 24 msec, the system moves to the next screen operation.

[Ⅱ] From $\overline{\text{INT-V}}$ pulse measurement to screen printing

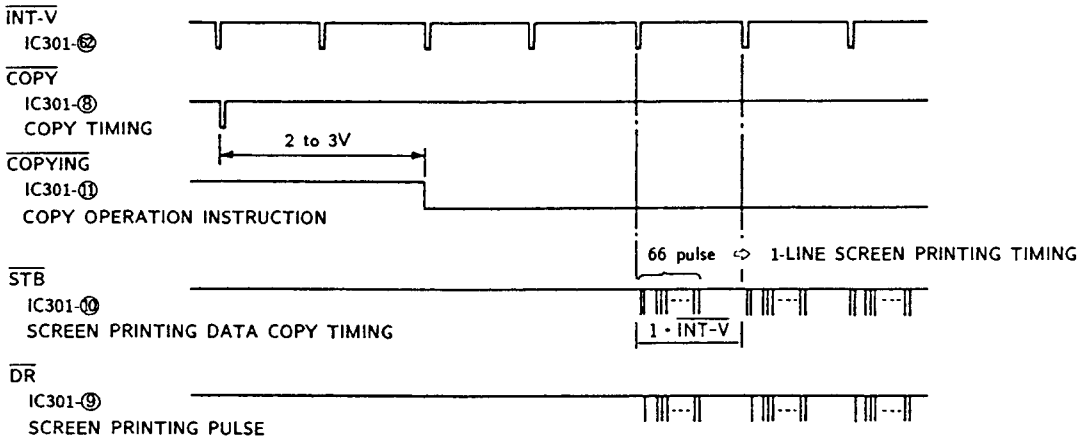


Fig.5-6. Screen Printing Timing

Operation

(i) When the platen motor rotation is stabilized and the $\overline{\text{INT-V}}$ period is stable, the $\overline{\text{COPY}}$ pulse is output to IC301-⑮ synchronized with $\overline{\text{INT-V}}$.

(ii) When the $\overline{\text{COPY}}$ pulse is input to IC301-⑮, IC103 outputs the $\overline{\text{COPYING}}$ pulse from its pin ⑫ to IC301-⑪ to tell it that IC103 is standing by for screen printing.

(iii) When IC301 verifies that $\overline{\text{COPYING}}$ is "L", it ouptuts $\overline{\text{STB}}$ and $\overline{\text{DR}}$. The screen printing timing is set by these signals.

*Note: If the period of $\overline{\text{INT-V}}$ fluctuates too greatly during screen printing, printing is stopped.

[Ⅲ] To the end of screen printing and stopping

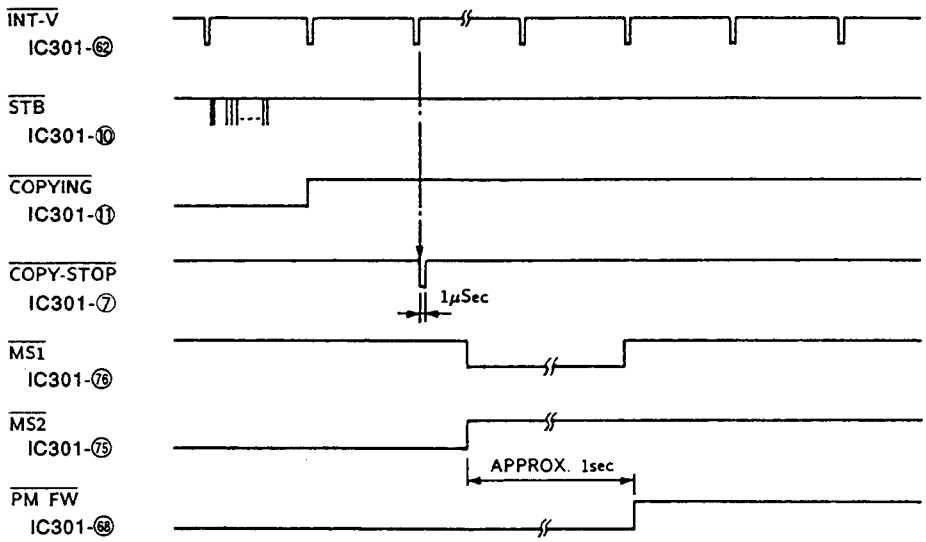


Fig.5-7. End of Screen Printing Timing

Operation

(i) IC103 counts the printing lines and when the specified number of lines have been printed, it outputs a "H" signal from its IC103-72 to IC301-13, which tells IC301 that the printing operation has ended and it outputs the $\overline{\text{COPY-STOP}}$ pulse.

*Note: The $\overline{\text{COPY-STOP}}$ pulse is also output even if $\overline{\text{COPYNING}}$ is "L", if IC 301 judges that something abnormal has arisen. In such a case, when this $\overline{\text{COPY-STOP}}$ pulse is input to IC103, it sets $\overline{\text{COPYING}}$ "II".
This characteristic can be used to analyze any problem that causes printing to stop. If $\overline{\text{COPY-STOP}}$ was issued while $\overline{\text{COPYING}}$ is "L", the cause is related to IC301 screen printint is then stopped. If $\overline{\text{COPY-STOP}}$ was issued while $\overline{\text{COPYING}}$ is "H", the cause is related to IC103.

(ii) After the $\overline{\text{COPY-STOP}}$ pulse, $\overline{\text{MS1}}$, $\overline{\text{MS2}}$ are changed to fast forward for about 1 second, then $\overline{\text{PM FW}}$ is set "H" to stop.
Reverse the Head U/D motor (IC301-63, 64: "L","II") and check that the Head goes up (IC301-59, 60: "II","L"). Then stop the motor.
(IC301-63, 64: "H","H").

5-4-3. Mode set

No. 1 through 4, 6 through 10 of DIP switch S302 on the rear panel are input to IC301 to select each screen printing mode. The mode set is input from IC301-38 to IC103-70 in serial data format when the PRINT key and COPY key are pressed.
Each screen printing mode cannot be selected during screen printing.

5-5. MOTOR DRIVE SECTION (IC201)

The platen motor, Head UP/down motor, and Door motor are driven with IC201, IC202, IC203, and IC204,. They are all controlled by IC301.

5-5-1. Platen motor

The platen motor speed is controlled by IC201(M51970L). The frequency of the FG (optic read out) of the motor section is detected and fed back to IC201, which controls motor drive transistor Q205 to control the speed.

IC204 (M54544AL) can drive the motor in the forward or reverse direction.

The motor is turned ON/OFF and its speed controlled by IC301-㉕,㉖,㉗,㉘.

(See the explanation of the system control section.)

Since this unit produces the $\overline{\text{INT-V}}$ signal that provides the screen printing timing by dividing the FG frequency, even if there is some slight fluctuation in the FG frequency, the paper feed distance and printing quality are held constant.

5-5-2. Head U/D motor and DOOR motor

The Head U/D motor and DOOR motor are controlled by IC202 and 203 (both are M54543L). This IC can drive the motor in the forward or reverse direction, and it is controlled by IC301-㉕,㉖,㉓,㉔.

Head U/D motor

	IC301-㉓	IC301-㉔	Operation
DOWN	H	L	goes down the head
UP	L	H	goes up the head
STOP	H	H	locks to motor

Door motor

	IC301-㉕	IC301-㉖	Operation
OPEN	L	H	Opens the door
CLOSE	H	L	Closes the door

The above motor operation is controlled by detecting the condition of Head and Door with IC301 Pin㉕,㉖,㉙,㉚.

Head condition

	IC301-㉙	IC301-㉚	Condition
Top	L	L	Top position of the head to open the door.
Middle	H	L	Head is at this position except for PRINT
Bottom	L	H	Head is pressed against the platen.

Door condition

	IC301-㉕	IC301-㉖	Condition
Open	L	H	The door is opened.
Close	H	L	The door is closed.

5-6. THERMAL HEAD SECTION

The thermal head of this unit comprise 1-line of 1024 dots (64 bits × 16) and prints out the screen vertically.

5-6-1. Configuration

There are sixteen sets of the assemblise shown below. (The DATA inputs are DATA1 to 16. The other terminals are common.)

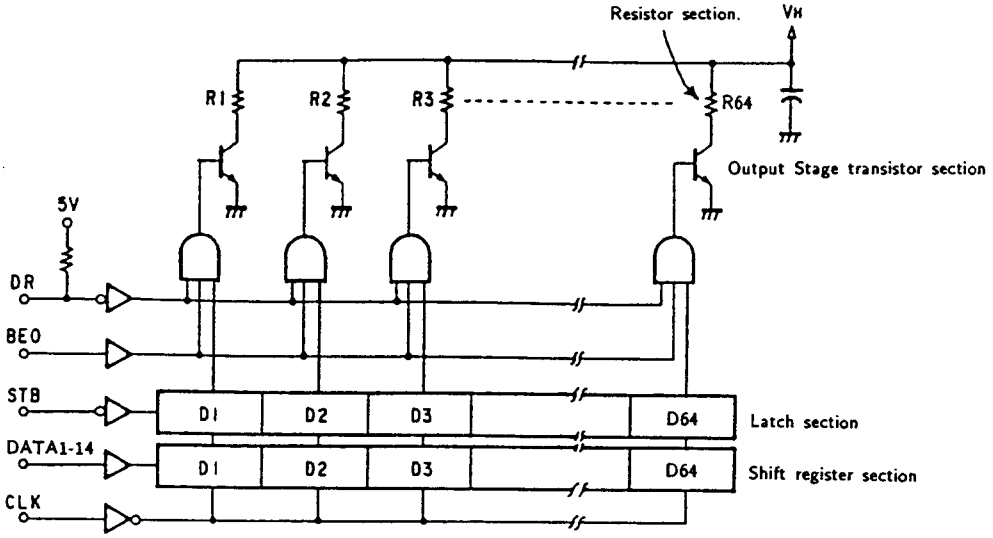


Fig.5-8. Head Internal Circuit Configuration

5-6-2. Timing Chart

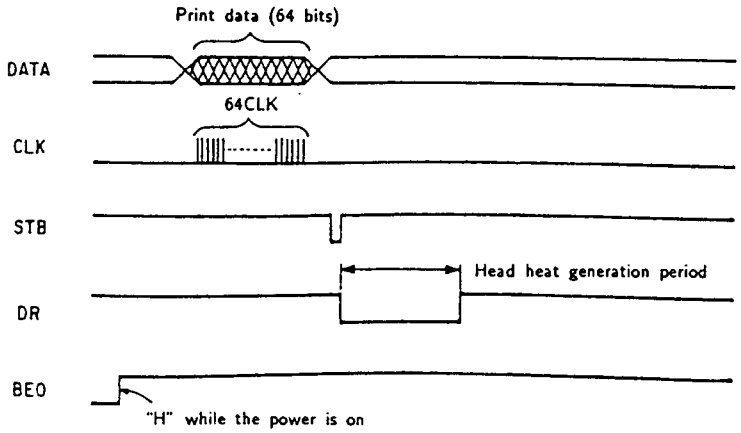


Fig.5-9. Timing Chart

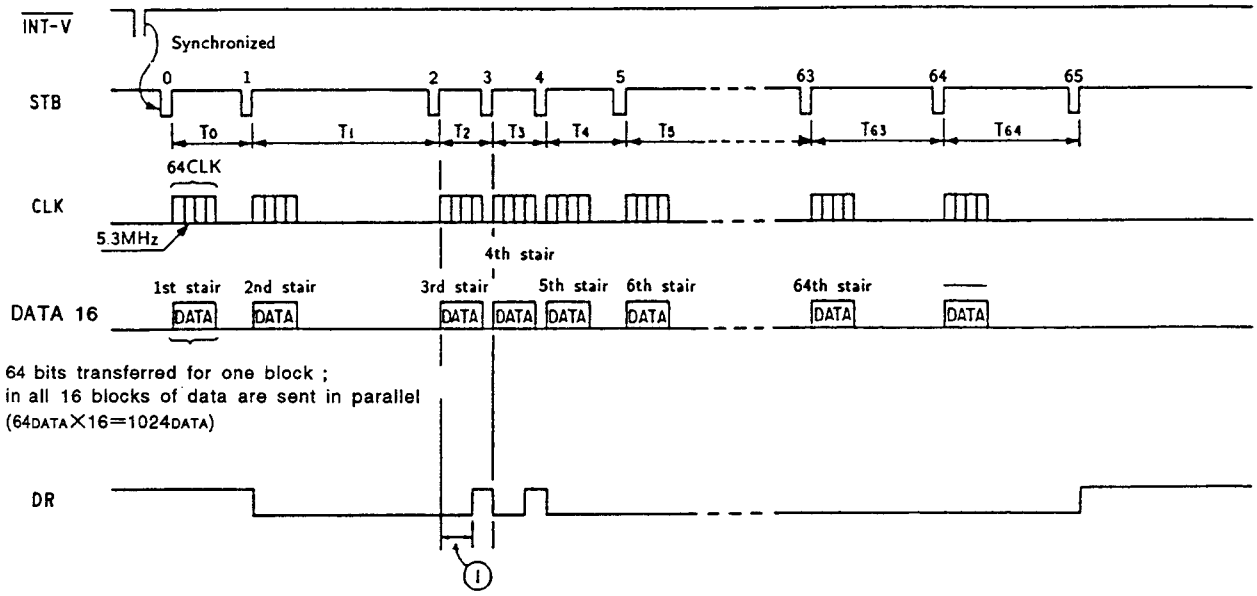


Fig.5-10. Stair Generation

5-6-3. Basic operation

All the signals are input to head from IC103. This section only explains the operations for one block. (The operations for the other blocks are the same.)

(i) The 64 data items of screen printing are input to the shift register synchronized with CLK.

(ii) When the STB pulse is input, the data input in (i) is moved from the shift register section to the latch section.

(iii) When the DR pulse is input, the output stage transistors are switched ON/OFF by the "H" and "L" latch section data. While the transistors are on, the resistors heat up and thermosensitive paper changes color. The amount of heat generated is controlled by varying the length of the DR pulses, so the color darkness of the printing on thermosensitive paper can be varied.

* Note : The BEO terminal goes from "L" to "H" only when the power is turned on. After that it stays "H".

5-6-4. Stair generation

As explained in the last section on basic operation, the darkness of the printing can be controlled with the DR pulses, but it is also possible to change the darkness by changing the high and low data input to the latch section. This section explains this method.

(i) The data recorded in video memory IC104 during print is input to gradation data generation circuit IC103 by one print line using a picture variable power operation circuit in IC103. The stair data generation circuit outputs the 6 bits of data recorded in IC103 as one of 64 levels. If the 6-bit data is "3" , then DATA "H" is sent to the head during the 1st, 2nd, and 3rd stairs of DATA 1 to 6 in Fig.5-10, but from the 4th stairs and later, the DATA "L" is sent.
In this way, the screen is printed with the third stair, but from the fourth stair and later is not printed.(See the explanation of the basic oerations in 5-6-3.)

(ii) The data is input to IC103, when the "0" STB pulse synchronized with INT-V is input, the first stair data is sent to the head shift register section synchronized with CLK.

(iii) When the "1"STB pulse is input, the 1st stair data is transferred to the latch section and the 2nd stair data is input to the shift register section. At the same time, the DR pulse goes "L" and the "H" data among the data input as the first stair data switches on the corresponding output stage transistors, heating up the corresponding resistors. The "L" data switches OFF the corresponding output stage transistors so those resistors do not heat up.

This operation is carried out 64 times. If "H" data is sent the 1 through 64 times, the resistors generate heat the entire time and the printing is the blackest possible. If the data is only high until the 32 times, the printing is an intermediate stair. This is how intermediate stairs are generated by sending high data a certain number of times and generating. heat in the resistors that many times.

(iv) Thus, by controlling the time until the next data is transferred to the latch, the darkness of intermediate stairs can be achieved simply. In other words, intermediate stair darkness can be controlled by changing the STB intervals, T_0, T_1, T_2, T_3, T_4, · · · · · T_{63}, T_{64}.

Specifically, IC301 matches the intervals T_1 to T_{64} to the paper's γ characteristic (the degree of darkening relative to the heat applied). This is called γ characteristic control.

(v) If the DR pulse is also controlled as described in 5-6-3, even fine stair can be expressed.

* Note: The section in ① is generated when the STB pulse T interval is 26μsec. (The STB pulse T interval is a minimum of 26 μsec.)

Thus, this unit provides smooth expression of intermediate stairs by controlling the STB pulse T interval and the DR pulses.

5-6-5. Temperature compensation

As explained in 5-6-4, intermediate stairs are expressed by controlling the STB pulse T interval and the DR pulses, but since the energy required to make thermosensitive paper turn color varies with the room temperature and with the heat generated by and built up in the printing head during continuous printing.

This unit has a built-in thermistor (CN101-①,②) IC301 measures the change in the head temperature and to compensate for temperature change controls the STB pulse T interval and the DR pulse, just as is done for stair generation. Specifically, when the temperature rises it reduces the STB pulse T interval and the DR pulses, but when the temperature falls, it increases the STB pulse T interval and the DR pulses.

SECTION 6
EXPLODED VIEWS

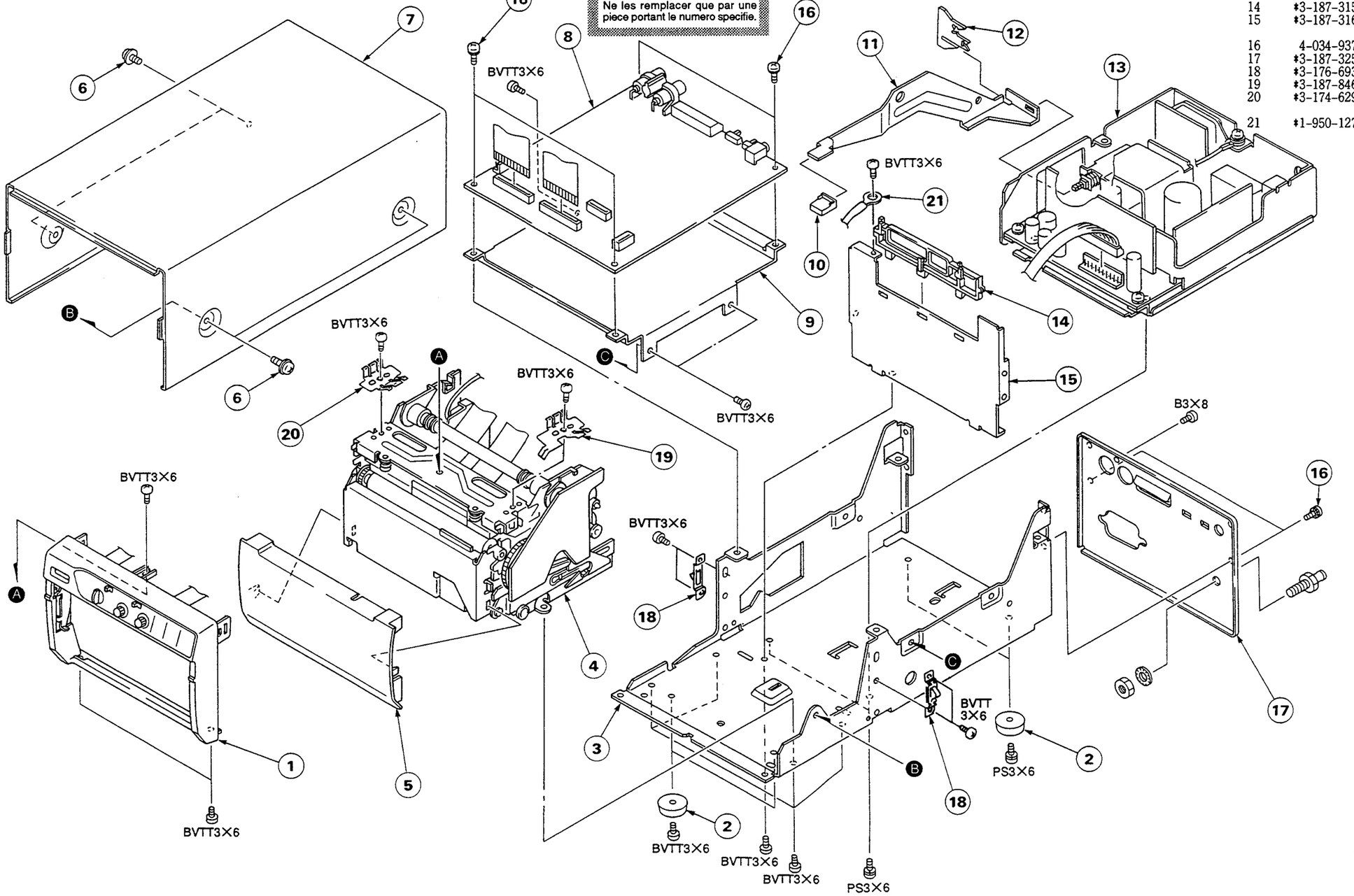
NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked because they are seldom required for routine servicing.Some delay should be expected when ordering these items.

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

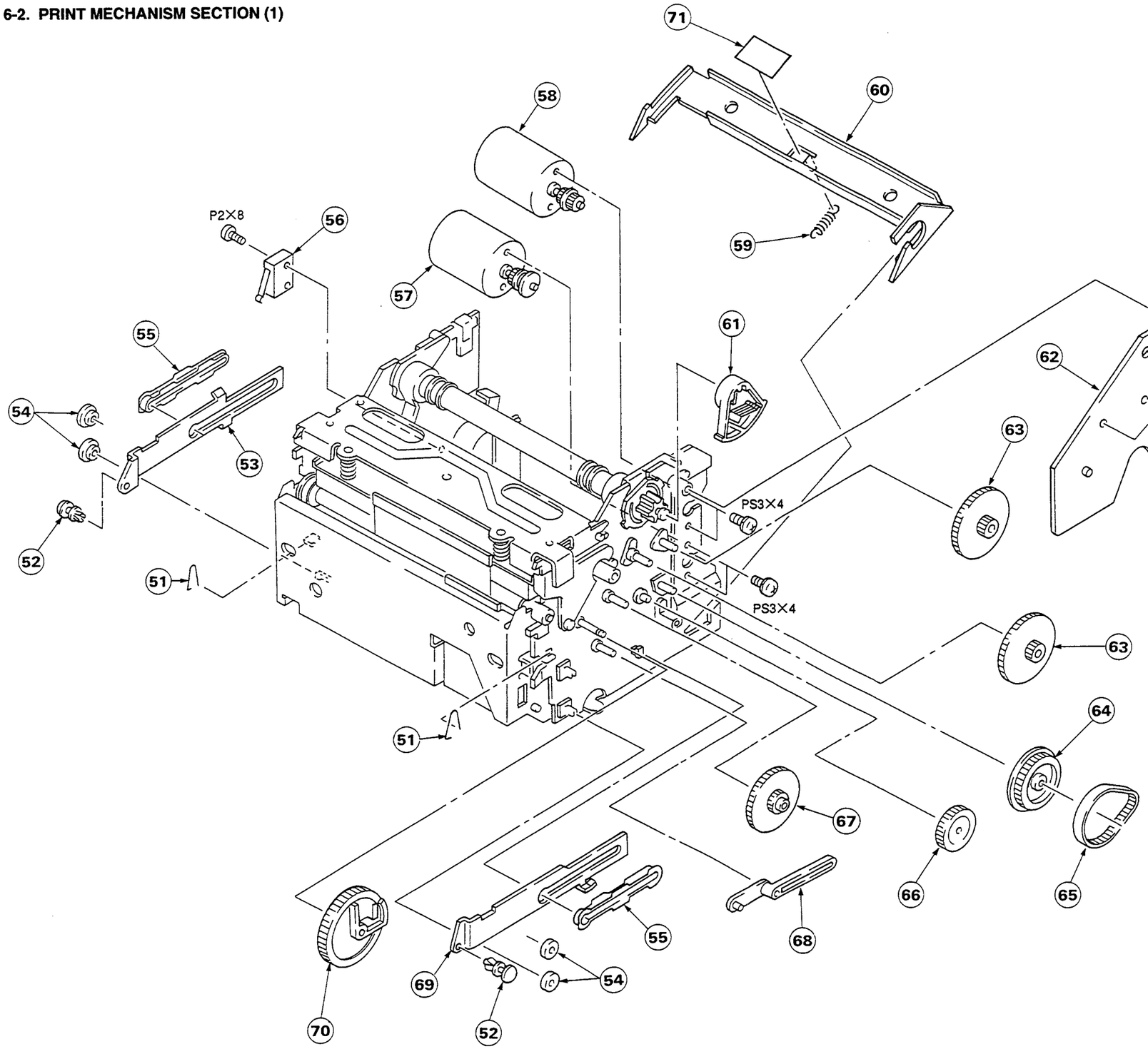
Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

6-1. CHASSIS SECTION



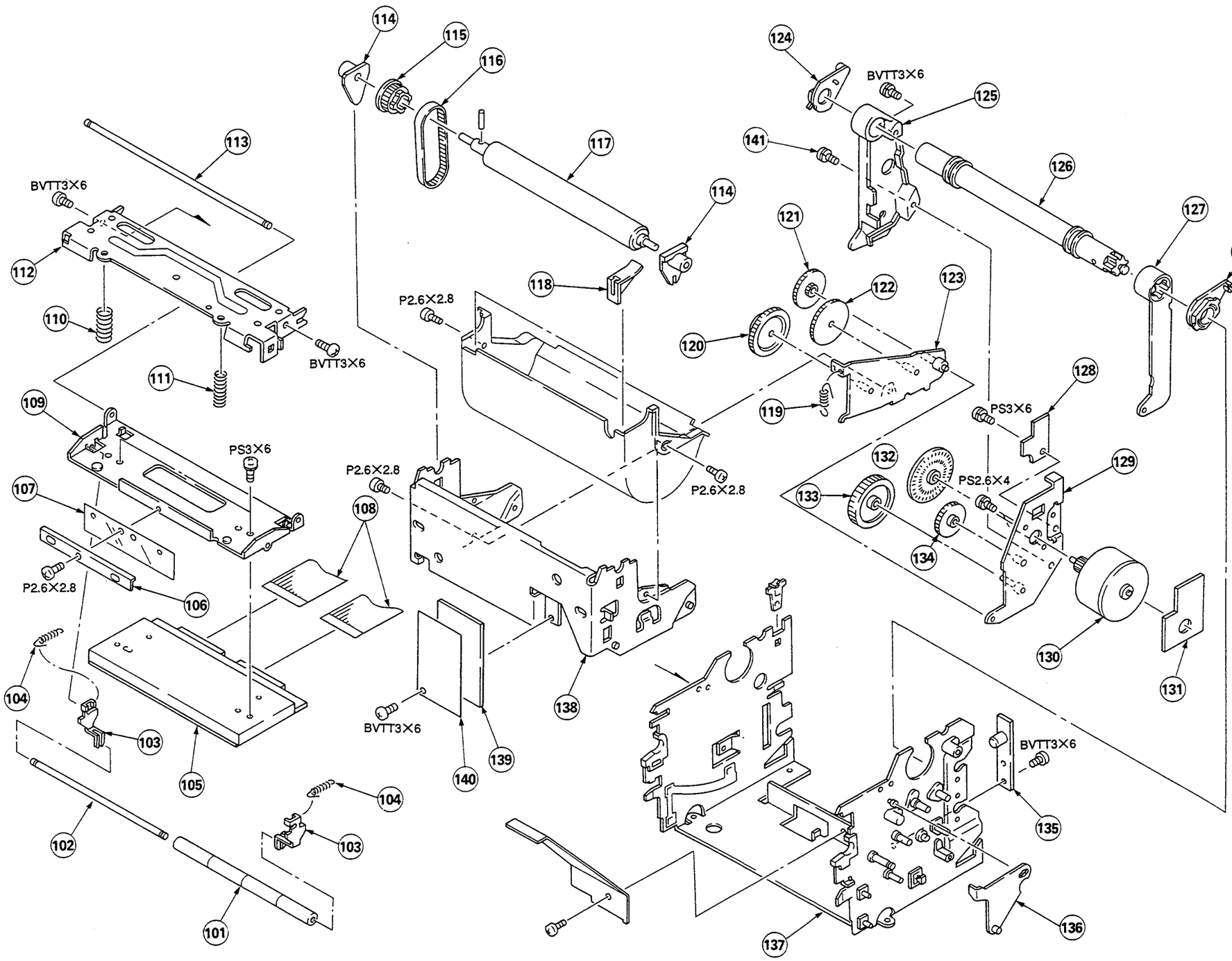
Ref.No	Part No.	Description	Remark
1	1-473-100-11	PANEL UNIT, FRONT	
2	3-734-866-01	FOOT	
3	*3-187-320-01	CHASSIS, FRAME	
4	*A-8265-916-A	BLOCK ASSY, MECHANICAL	
5	3-187-754-11	PANEL, DOOR (UP-890CE)	
	3-187-754-21	PANEL, DOOR (UP-890MD)	
6	4-886-821-11	SCREW, M3 CASE	
7	*3-187-319-01	COVER, TOP	
8	*A-8265-924-A	COMPLETE PCB, MA-19	
9	*3-187-755-01	PLATE, SHIELD	
10	3-187-313-01	BUTTON, POWER	
11	*3-173-923-03	ROD, POWER SWITCH	
12	*3-173-922-02	STOPPER, ROD"	
13	⚠*1-468-002-11	SWITCHING REGULATOR (SOPS-1088)	
14	*3-187-315-01	CLAMP, HARNESS	
15	*3-187-316-01	CHASSIS, CENTER	
16	4-034-937-01	SCREW (M3), TAPPING	
17	*3-187-325-11	PANEL, REAR	
18	*3-176-693-01	PLATE, GROUND (TC)	
19	*3-187-846-01	PLATE, GROUND (F)	
20	*3-174-629-02	PLATE, GROUND	
21	*1-950-127-13	HARNESS (H)	

6-2. PRINT MECHANISM SECTION (1)



Ref.No	Part No.	Description	Remark
51	♯3-173-548-02	SPRING, GROUND	
52	3-531-576-11	RIVET	
53	♯3-173-554-01	RAIL (L)	
54	3-741-065-01	ROLLER, SLIDE	
55	3-173-558-01	GUIDE, RAIL	
56	1-554-512-00	SWITCH, MICRO	
57	X-3167-435-1	MOTOR ASSY, S GEAR	
58	X-3167-434-1	MOTOR ASSY, DOOR	
59	3-173-559-01	SPRING (LOCK), TENSION	
60	♯3-173-981-02	ARM, LOCK	
61	X-3166-380-1	GEAR ASSY, DOOR	
62	♯1-641-592-11	PC BOARD SE-9	
63	3-173-550-01	GEAR (D), IDLER	
64	3-173-553-02	PULLEY (H), GEAR	
65	3-173-560-01	BELT, 90TN	
66	3-173-551-01	GEAR (S), IDLER	
67	3-173-549-01	GEAR (H), IDLER	
68	3-173-556-01	LINK, EJECT	
69	♯3-173-555-01	RAIL (R)	
70	X-3166-379-1	GEAR ASSY, CAM	
71	3-187-838-01	SHEET PROTECTION	

6-3. PRINT MECHANISM SECTION (2)



Ref.No	Part No.	Description	Remark
101	3-745-319-01	ROLLER, PRESS	
102	‡3-173-562-02	SHAFT, PRESS	
103	‡3-173-979-01	HOLDER, PRESS	
104	3-173-563-02	SPRING (PRESS), TENSION	
105	1-500-197-11	HEAD, THERMAL (LV5414)	
106	‡3-173-564-01	HOLDER, SHEET	
107	‡3-174-266-02	SHEET, GUIDE	
108	1-769-536-11	WIRE (FLAT TYPE) (26 CORE)	
109	‡3-173-980-01	HOLDER, HEAD	
110	3-173-978-01	SPRING (B), COMPRESSION	
111	3-173-977-02	SPRING (S), COMPRESSION	
112	‡3-187-314-01	HOLDER, SPRING	
113	3-173-547-01	SHAFT, HEAD	
114	3-173-579-01	BEARING, PLATEN	
115	3-173-578-02	PULLEY, PLATEN	
116	3-174-267-02	BELT, 110 TN	
117	3-173-615-02	PLATEN	
118	3-741-062-11	STAY, ROLL	
119	3-173-561-01	SPRING (BELT), TENSION	
120	3-173-616-02	PULLEY (P), GEAR	
121	3-173-566-01	GEAR (A)	
122	3-173-581-01	GEAR (G), IDLER	
123	‡X-3166-383-4	BRACKET ASSY, GEAR	
124	3-173-557-02	BEARING, ARM	
125	3-173-612-02	ARM (L)	
126	3-173-610-02	PIPE, ARM	
127	3-173-611-01	ARM (R)	
128	‡1-655-125-11	PC BOARD SU-20	
129	‡X-3166-382-2	BRACKET ASSY, MOTOR	
130	X-3166-426-2	MOTOR ASSY, M GEAR	
131	‡1-641-591-11	PC BOARD SE-9	
132	X-3167-651-1	FG UNIT	
133	3-173-565-01	GEAR (M), IDLER	
134	3-173-566-01	GEAR (A)	
135	‡1-655-123-11	PC BOARD C-19	
136	‡X-3166-434-2	LINK ASSY, HEAD	
137	‡X-3166-384-4	CHASSIS (OUTSERT) ASSY, MECH	
138	‡3-173-620-01	CHASSIS, INNER	
139	‡1-655-124-11	PC BOARD PTC-35	
140	‡3-187-939-01	SHEET PROTECTION, PTC	
141	4-034-937-01	SCREW (M3), TAPPING	

SECTION 7
ELECTRICAL PARTS LIST

C-19 LE-11 MA-19

NOTE:
- Items marked '*' are not stocked because they are seldom required for routine servicing. Some delay should be expected when ordering these items.
- All variable and adjustable resistors have characteristic curve B, unless otherwise stated.

RESISTORS
- All resistors are in ohms
- F:non-flammable

When indicating part by reference number, please include the board name.

CAPACITORS
- MF: μF, PF: μμF

COILS
- MMH: mH, UH: μH

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

Ref.No	Part No.	Description			Remark
	*1-655-123-11	C-19 BOARD			
		**********			
		<CONNECTOR>			
CN511	*1-954-381-11	HARNESS, SUB (I)			
		<DIODE>			
D511	8-749-923-97	PHOTO INTERRUPTER GP2S40K			
D512	8-749-923-97	PHOTO INTERRUPTER GP2S40K			
		<RESISTOR>			
R511	1-216-035-00	METAL	270	5%	1/10W
R512	1-216-035-00	METAL	270	5%	1/10W
##########					
	*1-655-126-11	LE-11 BOARD			
		**********			
	3-689-205-02	"HOLDER (A), LED"			
		<CONNECTOR>			
CN521	*1-949-470-11	HARNESS (D)			
		<DIODE>			
D521	8-719-945-20	DIODE GL-520			
		<RESISTOR>			
R521	1-216-295-91	CONDUCTOR 2012			
##########					
	*A-8265-924-A	MA-19 BOARD, COMPLETE			
		**********			
		<BUZZER>			
BZ301	1-529-080-11	BUZZER, PIEZOELECTRIC			
		<CAPACITOR>			
C1	1-126-923-11	ELECT	220uF	20%	10V
C2	1-104-664-11	ELECT	47uF	20%	25V
C3	1-163-220-11	CERAMIC	3PF		50V
C4	1-163-085-00	CERAMIC	2PF		50V
C5	1-163-222-11	CERAMIC	5PF		50V
C6	1-163-038-91	CERAMIC	0.1uF		25V
C7	1-126-111-11	ELECT	3.3uF	20%	50V
C8	1-163-038-91	CERAMIC	0.1uF		25V
C9	1-163-038-91	CERAMIC	0.1uF		25V
C10	1-163-038-91	CERAMIC	0.1uF		25V
C11	1-163-227-11	CERAMIC	10PF		50V
C12	1-163-227-11	CERAMIC	10PF		50V
C13	1-104-664-11	ELECT	47uF	20%	25V
C14	1-163-235-11	CERAMIC	22PF	5%	50V
C15	1-163-235-11	CERAMIC	22PF	5%	50V
C16	1-163-235-11	CERAMIC	22PF	5%	50V
C17	1-126-111-11	ELECT	3.3uF	20%	50V
C18	1-164-232-11	CHIP CERAMIC	0.01uF	10%	50V
C19	1-124-903-11	ELECT	1uF	20%	50V
C20	1-164-161-11	CERAMIC	0.0022uF	10%	50V
C21	1-126-964-11	ELECT	10uF	20%	50V
C22	1-124-916-11	ELECT	22uF	20%	25V
C23	1-163-038-91	CERAMIC	0.1uF		25V
C24	1-163-038-91	CERAMIC	0.1uF		25V
C25	1-124-903-11	ELECT	1uF	20%	50V
C26	1-124-903-11	ELECT	1uF	20%	50V
C27	1-124-903-11	ELECT	1uF	20%	50V
C28	1-126-923-11	ELECT	220uF	20%	10V
C29	1-163-038-91	CERAMIC	0.1uF		25V
C30	1-163-038-91	CERAMIC	0.1uF		25V
C31	1-124-903-11	ELECT	1uF	20%	50V
C32	1-124-903-11	ELECT	1uF	20%	50V
C33	1-164-232-11	CERAMIC	0.01uF	10%	50V
C50	1-163-038-91	CERAMIC	0.1uF		25V
C51	1-104-664-11	ELECT	47uF	20%	25V
C54	1-163-038-91	CERAMIC	0.1uF		25V
C55	1-126-964-11	ELECT	10uF	20%	50V
C93	1-104-664-11	ELECT	47uF	20%	25V
C94	1-104-664-11	ELECT	47uF	20%	25V
C95	1-164-004-11	CERAMIC	0.1uF	10%	25V
C96	1-164-004-11	CERAMIC	0.1uF	10%	25V
C97	1-104-664-11	ELECT	47uF	20%	25V
C98	1-163-038-91	CERAMIC	0.1uF		25V
C99	1-126-964-11	ELECT	10uF	20%	50V
C101	1-163-097-00	CERAMIC	15PF	5%	50V
C102	1-163-097-00	CERAMIC	15PF	5%	50V
C103	1-163-239-11	CERAMIC	33PF	5%	50V
C104	1-163-239-11	CERAMIC	33PF	5%	50V
C105	1-163-239-11	CERAMIC	33PF	5%	50V
C106	1-163-121-00	CERAMIC	150PF	5%	50V
C107	1-163-263-11	CERAMIC	330PF	5%	50V
C109	1-126-964-11	ELECT	10uF	20%	50V
C110	1-163-038-91	CERAMIC	0.1uF		25V
C112	1-163-038-91	CERAMIC	0.1uF		25V
C113	1-126-964-11	ELECT	10uF	20%	50V
C114	1-163-038-91	CERAMIC	0.1uF		25V
C115	1-104-664-11	ELECT	47uF	20%	25V
C116	1-104-664-11	ELECT	47uF	20%	25V
C117	1-163-038-91	CERAMIC	0.1uF		25V
C118	1-163-038-91	CERAMIC	0.1uF		25V
C119	1-163-038-91	CERAMIC	0.1uF		25V
C120	1-163-038-91	CERAMIC	0.1uF		25V
C121	1-163-038-91	CERAMIC	0.1uF		25V
C122	1-163-038-91	CERAMIC	0.1uF		25V
C123	1-163-038-91	CERAMIC	0.1uF		25V

Ref.No	Part No.	Description			Remark
C124	1-163-038-91	CERAMIC	0.1uF		25V
C125	1-163-038-91	CERAMIC	0.1uF		25V
C126	1-163-038-91	CERAMIC	0.1uF		25V
C127	1-163-038-91	CERAMIC	0.1uF		25V
C128	1-163-038-91	CERAMIC	0.1uF		25V
C129	1-163-038-91	CERAMIC	0.1uF		25V
C130	1-163-038-91	CERAMIC	0.1uF		25V
C131	1-163-038-91	CERAMIC	0.1uF		25V
C132	1-163-038-91	CERAMIC	0.1uF		25V
C133	1-163-038-91	CERAMIC	0.1uF		25V
C134	1-163-038-91	CERAMIC	0.1uF		25V
C136	1-163-243-91	CHIP CERAMIC	47P	5%	50V
C137	1-163-243-91	CHIP CERAMIC	47P	5%	50V
C201	1-130-489-00	MYLAR	0.033uF	5%	50V
C202	1-163-038-91	CERAMIC	0.1uF		25V
C203	1-126-964-11	ELECT	10uF	20%	50V
C204	1-164-004-11	CERAMIC	0.1uF	10%	25V
C205	1-124-927-11	ELECT	4.7uF	20%	50V
C206	1-126-964-11	ELECT	10uF	20%	50V
C207	1-126-964-11	ELECT	10uF	20%	50V
C208	1-126-964-11	ELECT	10uF	20%	50V
C209	1-164-232-11	CERAMIC	0.01uF	10%	50V
C210	1-164-232-11	CERAMIC	0.01uF	10%	50V
C301	1-163-033-91	CERAMIC	0.022uF		50V
C302	1-164-232-11	CERAMIC	0.01uF	10%	50V
C307	1-104-664-11	ELECT	47uF	20%	25V
C308	1-126-966-11	ELECT	33uF	20%	50V
C309	1-163-038-91	CERAMIC	0.1uF		25V
C340	1-164-232-11	CERAMIC	0.01uF	10%	50V
C341	1-164-232-11	CERAMIC	0.01uF	10%	50V
C342	1-164-232-11	CERAMIC	0.01uF	10%	50V
C343	1-164-232-11	CERAMIC	0.01uF	10%	50V
C344	1-164-232-11	CERAMIC	0.01uF	10%	50V
C346	1-163-038-91	CERAMIC	0.1uF		25V
C351	1-163-038-91	CERAMIC	0.1uF		25V
C352	1-126-964-11	ELECT	10uF	20%	50V
C353	1-163-038-91	CERAMIC	0.1uF		25V
C354	1-126-964-11	ELECT	10uF	20%	50V
C355	1-163-038-91	CERAMIC	0.1uF		25V
C356	1-163-038-91	CERAMIC	0.1uF		25V
C357	1-104-664-11	ELECT	47uF	20%	25V
C358	1-164-232-11	CERAMIC	0.01uF	10%	50V
C359	1-164-232-11	CERAMIC	0.01uF	10%	50V
C360	1-164-232-11	CERAMIC	0.01uF	10%	50V
C361	1-164-232-11	CERAMIC	0.01uF	10%	50V
C362	1-164-232-11	CERAMIC	0.01uF	10%	50V
C363	1-164-232-11	CERAMIC	0.01uF	10%	50V
C364	1-164-232-11	CERAMIC	0.01uF	10%	50V
C365	1-164-232-11	CERAMIC	0.01uF	10%	50V
C366	1-164-232-11	CERAMIC	0.01uF	10%	50V
C367	1-164-232-11	CERAMIC	0.01uF	10%	50V
		<CONNECTOR>			
CN1	1-691-431-11	CONNECTOR ASSY, BNC			
CN2	1-569-536-11	SOCKET, CONNECTOR 7P			
CN3	*1-564-005-11	PIN, CONNECTOR 6P			
CN101	*1-764-781-11	SOCKET, CONNECTOR 26P			
CN102	*1-764-781-11	SOCKET, CONNECTOR 26P			
CN201	1-506-469-11	PIN, CONNECTOR 4P			
CN202	1-506-471-11	PIN, CONNECTOR 6P			
CN301	1-562-719-11	SOCKET, CONNECTOR 10P			
CN302	*1-564-007-11	PIN, CONNECTOR 8P			
CN303	*1-506-468-11	PIN, CONNECTOR 3P			
CN304	*1-564-001-11	PIN, CONNECTOR 2P			
CN305	1-506-467-11	PIN, CONNECTOR 2P			

Ref.No	Part No.	Description	Remark
CN306	1-569-536-11	SOCKET, CONNECTOR 7P	
CN307	1-506-469-11	PIN, CONNECTOR 4P	
		<DIODE>	
D1	8-719-801-78	DIODE 1SS184	
D2	8-719-801-78	DIODE 1SS184	
D3	8-719-801-78	DIODE 1SS184	
D301	8-719-801-78	DIODE 1SS184	
D302	8-719-801-78	DIODE 1SS184	
D303	8-719-801-78	DIODE 1SS184	
D304	8-719-801-78	DIODE 1SS184	
D305	8-719-801-78	DIODE 1SS184	
D306	8-719-801-78	DIODE 1SS184	
D307	8-719-801-78	DIODE 1SS184	
D308	8-719-801-78	DIODE 1SS184	
		<FERRITE BEAD>	
FB1	1-410-397-21	FERRITE BEAD INDUCTOR 1.1UH	
FB2	1-410-397-21	FERRITE BEAD INDUCTOR 1.1UH	
FB101	1-410-397-21	FERRITE BEAD INDUCTOR 1.1UH	
		<FILTER>	
FL1	1-760-578-11	FILTER, CERAMIC	
FL2	1-579-348-11	FILTER, CERAMIC	
FL3	1-236-129-11	NCAPSULATED COMPONENT	
FL4	1-410-397-21	FERRITE BEAD INDUCTOR 1.1UH	
FL5	1-410-397-21	FERRITE BEAD INDUCTOR 1.1UH	
FL301	1-236-129-11	NCAPSULATED COMPONENT	
FL302	1-408-397-00	INDUCTOR 1UH	
FL303	1-408-397-00	INDUCTOR 1UH	
		<IC>	
IC1	8-759-304-10	IC HA11465A	
IC2	8-759-300-71	IC HD14053BFP	
IC3	8-759-051-50	IC TL5501CDWA	
IC4	8-759-051-51	IC MB40776PF	
IC5	8-759-231-58	IC TA7812S	
IC101	8-759-287-50	IC CXD8932Q	
IC102	8-759-925-90	IC SN74HC74ANS	
IC103	8-759-292-87	IC CXD8938Q	
IC104	8-759-292-88	IC HM514280AJ-7	
IC201	8-759-051-52	IC M51970L	
IC202	8-759-600-24	IC M54543L	
IC203	8-759-600-24	IC M54543L	
IC204	8-759-633-10	IC M54544AL	
IC301	8-752-860-72	IC CXP80P116Q-2-256	
IC302	8-759-983-69	IC LM358PS	
IC303	8-759-925-80	IC SN74HC14ANS	
IC304	8-759-278-46	IC PST600DMT-T1	
		<JACK>	
J301	1-507-967-11	JACK	
		<INDUCTOR>	
L1	1-408-777-00	INDUCTOR CHIP 10UH	
L3	1-408-765-21	INDUCTOR CHIP 1UH	
L4	1-410-391-11	INDUCTOR CHIP 68UH	
L5	1-410-391-11	INDUCTOR CHIP 68UH	
L301	1-408-777-00	INDUCTOR CHIP 10UH	
		<TTRANSISTOR>	
Q1	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q2	8-729-216-22	TRANSISTOR 2SA1162-G	
Q3	8-729-216-22	TRANSISTOR 2SA1162-G	
Q4	8-729-230-49	TRANSISTOR 2SC2712-YG	

Ref.No	Part No.	Description	Remark
Q5	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q6	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q7	8-729-216-22	TRANSISTOR 2SA1162-G	
Q8	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q9	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q10	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q11	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q12	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q13	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q14	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q15	8-729-216-22	TRANSISTOR 2SA1162-G	
Q16	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q17	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q18	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q19	8-729-901-00	TRANSISTOR DTC124EK	
Q20	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q21	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q22	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q23	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q201	8-729-901-05	TRANSISTOR DTA124EK	
Q202	8-729-901-05	TRANSISTOR DTA124EK	
Q203	8-729-216-22	TRANSISTOR 2SA1162-G	
Q204	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q205	8-729-101-07	TRANSISTOR 2SB798-DL	
Q206	8-729-140-75	TRANSISTOR 2SD999-CLCK	
Q207	8-729-140-75	TRANSISTOR 2SD999-CLCK	
Q301	8-729-901-00	TRANSISTOR DTC124EK	
Q302	8-729-900-53	TRANSISTOR DTC114EK	
Q303	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q304	8-729-901-00	TRANSISTOR DTC124EK	

<RESISTOR>

Ref.No	Part No.				Remark
R1	1-216-029-00	METAL	150	5%	1/10W
R2	1-216-029-00	METAL	150	5%	1/10W
R3	1-216-073-00	METAL	10K	5%	1/10W
R4	1-216-073-00	METAL	10K	5%	1/10W
R5	1-216-025-00	METAL	100	5%	1/10W
R6	1-216-049-00	METAL	1K	5%	1/10W
R7	1-216-039-00	METAL	390	5%	1/10W
R8	1-216-043-91	METAL	560	5%	1/10W
R9	1-216-049-00	METAL	1K	5%	1/10W
R10	1-216-039-00	METAL	390	5%	1/10W
R11	1-216-043-91	METAL	560	5%	1/10W
R12	1-216-049-00	METAL	1K	5%	1/10W
R13	1-216-025-00	METAL	100	5%	1/10W
R14	1-216-073-00	METAL	10K	5%	1/10W
R15	1-216-073-00	METAL	10K	5%	1/10W
R16	1-216-049-00	METAL	1K	5%	1/10W
R17	1-216-025-00	METAL	100	5%	1/10W
R18	1-216-065-00	METAL	4.7K	5%	1/10W
R20	1-216-095-00	METAL	82K	5%	1/10W
R21	1-216-077-00	METAL	15K	5%	1/10W
R22	1-216-067-00	METAL	5.6K	5%	1/10W
R23	1-216-077-00	METAL	15K	5%	1/10W
R24	1-216-069-00	METAL	6.8K	5%	1/10W
R25	1-216-073-00	METAL	10K	5%	1/10W
R26	1-216-069-00	METAL	6.8K	5%	1/10W
R27	1-216-049-00	METAL	1K	5%	1/10W
R28	1-216-035-00	METAL	270	5%	1/10W
R29	1-216-071-00	METAL	8.2K	5%	1/10W
R30	1-216-079-00	METAL	18K	5%	1/10W
R31	1-216-049-00	METAL	1K	5%	1/10W
R32	1-216-049-00	METAL	1K	5%	1/10W
R33	1-216-071-00	METAL	8.2K	5%	1/10W
R34	1-216-079-00	METAL	18K	5%	1/10W

Ref.No	Part No.				Remark
R35	1-216-057-00	METAL	2.2K	5%	1/10W
R36	1-216-053-00	METAL	1.5K	5%	1/10W
R37	1-216-071-00	METAL	8.2K	5%	1/10W
R38	1-216-061-00	METAL	3.3K	5%	1/10W
R39	1-216-057-00	METAL	2.2K	5%	1/10W
R40	1-216-041-00	METAL	470	5%	1/10W
R41	1-216-041-00	METAL	470	5%	1/10W
R42	1-216-049-00	METAL	1K	5%	1/10W
R43	1-216-045-00	METAL	680	5%	1/10W
R44	1-216-045-00	METAL	680	5%	1/10W
R45	1-216-045-00	METAL	680	5%	1/10W
R46	1-216-049-00	METAL	1K	5%	1/10W
R47	1-216-033-00	METAL	220	5%	1/10W
R48	1-216-037-00	METAL	330	5%	1/10W
R49	1-216-049-00	METAL	1K	5%	1/10W
R50	1-216-073-00	METAL	10K	5%	1/10W
R51	1-216-057-00	METAL	2.2K	5%	1/10W
R52	1-216-073-00	METAL	10K	5%	1/10W
R53	1-216-023-00	METAL	82	5%	1/10W
R54	1-216-119-00	METAL	820K	5%	1/10W
R55	1-216-081-00	METAL	22K	5%	1/10W
R56	1-216-065-00	METAL	4.7K	5%	1/10W
R57	1-216-055-00	METAL	1.8K	5%	1/10W
R58	1-216-073-00	METAL	10K	5%	1/10W
R59	1-216-045-00	METAL	680	5%	1/10W
R59	1-216-069-00	METAL	6.8K	5%	1/10W
R60	1-216-049-00	METAL	1K	5%	1/10W
R61	1-216-065-00	METAL	4.7K	5%	1/10W
R62	1-216-041-00	METAL	470	5%	1/10W
R63	1-216-049-00	METAL	1K	5%	1/10W
R64	1-216-063-00	METAL	3.9K	5%	1/10W
R65	1-216-053-00	METAL	1.5K	5%	1/10W
R66	1-216-061-00	METAL	3.3K	5%	1/10W
R67	1-216-049-00	METAL	1K	5%	1/10W
R68	1-216-057-00	METAL	2.2K	5%	1/10W
R69	1-216-063-00	METAL	3.9K	5%	1/10W
R70	1-216-057-00	METAL	2.2K	5%	1/10W
R71	1-216-021-00	METAL	68	5%	1/10W
R72	1-216-075-00	METAL	12K	5%	1/10W
R73	1-216-067-00	METAL	5.6K	5%	1/10W
R74	1-216-033-00	METAL	220	5%	1/10W
R75	1-216-021-00	METAL	68	5%	1/10W
R76	1-216-073-00	METAL	10K	5%	1/10W
R77	1-216-069-00	METAL	6.8K	5%	1/10W
R80	1-216-051-00	METAL	1.2K	5%	1/10W
R81	1-216-057-00	METAL	2.2K	5%	1/10W
R82	1-216-057-00	METAL	2.2K	5%	1/10W
R83	1-216-071-00	METAL	8.2K	5%	1/10W
R84	1-216-067-00	METAL	5.6K	5%	1/10W
R85	1-216-049-00	METAL	1K	5%	1/10W
R86	1-216-051-00	METAL	1.2K	5%	1/10W
R87	1-216-057-00	METAL	2.2K	5%	1/10W
R88	1-216-057-00	METAL	2.2K	5%	1/10W
R89	1-216-071-00	METAL	8.2K	5%	1/10W
R90	1-216-067-00	METAL	5.6K	5%	1/10W
R91	1-216-049-00	METAL	1K	5%	1/10W
R95	1-216-033-00	METAL	220	5%	1/10W
R98	1-216-313-00	METAL	8.2	5%	1/10W
R99	1-216-313-00	METAL	8.2	5%	1/10W
R101	1-216-121-00	METAL	1M	5%	1/10W
R102	1-216-121-00	METAL	1M	5%	1/10W
R103	1-216-013-00	METAL	33	5%	1/10W
R104	1-216-013-00	METAL	33	5%	1/10W
R105	1-216-013-00	METAL	33	5%	1/10W
R106	1-216-025-00	METAL	100	5%	1/10W

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Ref.No	Part No.	Description			Remark
R107	1-216-025-00	METAL	100	5%	1/10W
R108	1-216-037-90	METAL	330	5%	1/10W
R108	1-216-041-00	METAL	470	5%	1/10W
R110	1-216-073-00	METAL	10K	5%	1/10W
R111	1-216-073-00	METAL	10K	5%	1/10W
R112	1-216-073-00	METAL	10K	5%	1/10W
R113	1-216-073-00	METAL	10K	5%	1/10W
R114	1-216-073-00	METAL	10K	5%	1/10W
R115	1-216-073-00	METAL	10K	5%	1/10W
R116	1-216-073-00	METAL	10K	5%	1/10W
R117	1-216-073-00	METAL	10K	5%	1/10W
R118	1-216-073-00	METAL	10K	5%	1/10W
R120	1-216-025-00	METAL	100	5%	1/10W
R121	1-216-025-00	METAL	100	5%	1/10W
R122	1-216-025-00	METAL	100	5%	1/10W
R123	1-216-025-00	METAL	100	5%	1/10W
R124	1-216-025-00	METAL	100	5%	1/10W
R125	1-216-025-00	METAL	100	5%	1/10W
R126	1-216-025-00	METAL	100	5%	1/10W
R127	1-216-025-00	METAL	100	5%	1/10W
R128	1-216-025-00	METAL	100	5%	1/10W
R129	1-216-025-00	METAL	100	5%	1/10W
R130	1-216-025-00	METAL	100	5%	1/10W
R131	1-216-025-00	METAL	100	5%	1/10W
R132	1-216-025-00	METAL	100	5%	1/10W
R133	1-216-025-00	METAL	100	5%	1/10W
R134	1-216-025-00	METAL	100	5%	1/10W
R135	1-216-025-00	METAL	100	5%	1/10W
R136	1-216-025-00	METAL	100	5%	1/10W
R137	1-216-025-00	METAL	100	5%	1/10W
R138	1-216-025-00	METAL	100	5%	1/10W
R139	1-216-025-00	METAL	100	5%	1/10W
R140	1-216-025-00	METAL	100	5%	1/10W
R141	1-216-025-00	METAL	100	5%	1/10W
R142	1-216-025-00	METAL	100	5%	1/10W
R143	1-216-025-00	METAL	100	5%	1/10W
R144	1-216-025-00	METAL	100	5%	1/10W
R145	1-216-025-00	METAL	100	5%	1/10W
R146	1-216-025-00	METAL	100	5%	1/10W
R147	1-216-025-00	METAL	100	5%	1/10W
R148	1-216-025-00	METAL	100	5%	1/10W
R149	1-216-295-91	CONDUCTOR 2012			
R150	1-216-295-91	CONDUCTOR 2012			
R151	1-216-295-91	CONDUCTOR 2012			
R152	1-216-295-91	CONDUCTOR 2012			
R153	1-216-025-00	METAL	100	5%	1/10W
R154	1-216-025-00	METAL	100	5%	1/10W
R156	1-216-295-91	CONDUCTOR 2012			
R157	1-216-295-91	CONDUCTOR 2012			
R201	1-216-099-00	METAL	120K	5%	1/10W
R202	1-216-091-00	METAL	56K	5%	1/10W
R203	1-216-081-00	METAL	22K	5%	1/10W
R204	1-216-013-00	METAL	33	5%	1/10W
R205	1-216-093-00	METAL	68K	5%	1/10W
R206	1-216-033-00	METAL	220	5%	1/10W
R207	1-216-057-00	METAL	2.2K	5%	1/10W
R208	1-216-059-00	METAL	2.7K	5%	1/10W
R210	1-216-295-91	CONDUCTOR 2012			
R211	1-216-045-00	METAL	680	5%	1/10W
R212	1-216-308-00	METAL	4.7	5%	1/10W
R213	1-216-308-00	METAL	4.7	5%	1/10W
R214	1-216-049-00	METAL	1K	5%	1/10W
R215	1-216-055-00	METAL	1.8K	5%	1/10W
R216	1-216-061-00	METAL	3.3K	5%	1/10W
R217	1-216-065-00	METAL	4.7K	5%	1/10W

Ref.No	Part No.	Description			Remark
R218	1-216-069-00	METAL	6.8K	5%	1/10W
R219	1-216-069-00	METAL	6.8K	5%	1/10W
R220	1-216-069-00	METAL	6.8K	5%	1/10W
R221	1-216-001-00	METAL	10	5%	1/10W
R222	1-216-001-00	METAL	10	5%	1/10W
R223	1-216-001-00	METAL	10	5%	1/10W
R224	1-216-001-00	METAL	10	5%	1/10W
R300	1-216-065-00	METAL	4.7K	5%	1/10W
R301	1-216-061-00	METAL	3.3K	5%	1/10W
R302	1-216-037-00	METAL	330	5%	1/10W
R303	1-216-037-00	METAL	330	5%	1/10W
R304	1-216-051-00	METAL	1.2K	5%	1/10W
R305	1-216-073-00	METAL	10K	5%	1/10W
R306	1-216-023-00	METAL	82	5%	1/10W
R307	1-216-101-00	METAL	150K	5%	1/10W
R308	1-216-077-00	METAL	15K	5%	1/10W
R309	1-216-081-00	METAL	22K	5%	1/10W
R310	1-216-097-00	METAL	100K	5%	1/10W
R311	1-216-063-00	METAL	3.9K	5%	1/10W
R312	1-216-073-00	METAL	10K	5%	1/10W
R313	1-216-073-00	METAL	10K	5%	1/10W
R314	1-216-049-00	METAL	1K	5%	1/10W
R315	1-216-049-00	METAL	1K	5%	1/10W
R316	1-216-037-00	METAL	330	5%	1/10W
R317	1-216-083-00	METAL	27K	5%	1/10W
R318	1-216-067-00	METAL	5.6K	5%	1/10W
R319	1-216-061-00	METAL	3.3K	5%	1/10W
R320	1-216-061-00	METAL	3.3K	5%	1/10W
R321	1-216-033-00	METAL	220	5%	1/10W
R322	1-216-061-00	METAL	3.3K	5%	1/10W
R323	1-216-025-00	METAL	100	5%	1/10W
R324	1-216-025-00	METAL	100	5%	1/10W
R325	1-216-041-00	METAL	470	5%	1/10W
R326	1-216-055-00	METAL	1.8K	5%	1/10W
R329	1-216-073-00	METAL	10K	5%	1/10W
R330	1-216-073-00	METAL	10K	5%	1/10W
R331	1-216-049-00	METAL	1K	5%	1/10W
R332	1-216-049-00	METAL	1K	5%	1/10W
R333	1-216-049-00	METAL	1K	5%	1/10W
R334	1-216-049-00	METAL	1K	5%	1/10W
R335	1-216-073-00	METAL	10K	5%	1/10W
R336	1-216-073-00	METAL	10K	5%	1/10W
R337	1-216-073-00	METAL	10K	5%	1/10W
R338	1-216-073-00	METAL	10K	5%	1/10W
R339	1-216-073-00	METAL	10K	5%	1/10W
R340	1-216-073-00	METAL	10K	5%	1/10W
R341	1-216-073-00	METAL	10K	5%	1/10W
R342	1-216-073-00	METAL	10K	5%	1/10W
R343	1-216-073-00	METAL	10K	5%	1/10W
R346	1-216-073-00	METAL	10K	5%	1/10W
R347	1-216-073-00	METAL	10K	5%	1/10W
R348	1-216-073-00	METAL	10K	5%	1/10W
R349	1-216-073-00	METAL	10K	5%	1/10W
R350	1-216-073-00	METAL	10K	5%	1/10W
R351	1-216-073-00	METAL	10K	5%	1/10W
R352	1-216-073-00	METAL	10K	5%	1/10W
R353	1-216-073-00	METAL	10K	5%	1/10W
R354	1-216-073-00	METAL	10K	5%	1/10W
R355	1-216-073-00	METAL	10K	5%	1/10W
R356	1-216-073-00	METAL	10K	5%	1/10W
R361	1-216-049-00	METAL	1K	5%	1/10W
R362	1-216-049-00	METAL	1K	5%	1/10W
R363	1-216-049-00	METAL	1K	5%	1/10W
R364	1-216-049-00	METAL	1K	5%	1/10W
R365	1-216-049-00	METAL	1K	5%	1/10W

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

MA-19 PTC-35 SE-9 SU-20
SWITCHING REGULATOR

Ref.No	Part No.	Description			Remark
R366	1-216-049-00	METAL	1K	5%	1/10W
R367	1-216-049-00	METAL	1K	5%	1/10W
R368	1-216-049-00	METAL	1K	5%	1/10W
R369	1-216-049-00	METAL	1K	5%	1/10W
R370	1-216-049-00	METAL	1K	5%	1/10W
R371	1-216-073-00	METAL	10K	5%	1/10W
R372	1-216-073-00	METAL	10K	5%	1/10W
R373	1-216-073-00	METAL	10K	5%	1/10W
R374	1-216-073-00	METAL	10K	5%	1/10W
R375	1-216-073-00	METAL	10K	5%	1/10W
R376	1-216-073-00	METAL	10K	5%	1/10W
R377	1-216-073-00	METAL	10K	5%	1/10W
R378	1-216-073-00	METAL	10K	5%	1/10W
R379	1-216-073-00	METAL	10K	5%	1/10W
R380	1-216-073-00	METAL	10K	5%	1/10W
R381	1-412-390-21	CONDUCTOR 0UH			
R382	1-412-390-21	CONDUCTOR 0UH			
		<VARIABLE RESISTOR>			
RV1	1-241-175-11	RES, ADJ, CERMET 220			
RV2	1-238-090-11	RES, ADJ, CERMET 10K			
RV201	1-241-092-11	RES, ADJ, CERMET 47K			
		<RELAY>			
RY1	1-515-614-11	RELAY			
		<SWITCH>			
S301	1-572-999-11	SWITCH, SLIDE			
S302	1-762-299-11	SWITCH, DIP (PIANO TYPE)			
S303	1-572-999-11	SWITCH, SLIDE			
		<CRYSTAL>			
X101	1-760-094-11	VIBRATOR, CRYSTAL			
X301	1-579-125-11	VIBRATOR, CERAMIC			
**********					
	#1-655-124-11	PTC-35 BOARD **********			
	3-187-312-01	HOLDER (P), LED			
		<CAPASITOR>			
C501	1-163-038-91	CERAMIC	0.1uF		25V
C502	1-163-038-91	CERAMIC	0.1uF		25V
		<CONNECTOR>			
CN501	#1-949-469-11	HARNESS (C)			
		<TRANSISTOR>			
Q501	8-719-988-59	TRANSISTOR PT501A			
Q502	8-729-019-26	TRANSISTOR PT493F			
		<RESISTOR>			
R501	1-216-025-00	METAL	100	5%	1/10W
R502	1-216-013-00	METAL	33	5%	1/10W
R503	1-216-295-91	CONDUCTOR 2012			
**********					
	#1-641-592-11	SE-9 BOARD **********			
SUM3	1-690-506-11	CORE, FLAT TYPE (7 CORE)			
**********					

Ref.No	Part No.	Description			Remark
	#1-655-125-11	SU-20 BOARD **********			
		<CONNECTOR>			
CN601	1-506-481-11	PIN, CONNECTOR 2P			
**********					
	⚠#1-468-002-11	SWITCHING REGULATOR (SOPS-1088) **********			
	#2-409-035-01	CASE, ASSY			
	#1-954-340-11	HARNESS			
	#1-655-574-11	C BOARD *******			
		<CAPACITOR>			
C181	1-137-169-00	FILM	0.22uF		50V
C182	1-136-153-00	FILM	0.01uF		50V
C183	1-130-471-00	FILM	1000PF		50V
C184	1-137-171-00	FILM	0.33uF		50V
C185	1-124-478-11	ELECT	100uF		25V
C601	1-164-331-91	CERAMIC	470PF		500V
C602	1-164-331-91	CERAMIC	470PF		500V
C607	1-136-165-00	FILM	0.1uF		50V
C611	1-136-165-00	FILM	0.1uF		50V
C612	1-137-171-00	FILM	0.33uF		50V
C616	1-136-153-00	FILM	0.01uF		50V
C617	1-136-165-00	FILM	0.1uF		50V
C618	1-136-153-00	FILM	0.01uF		50V
C619	1-130-012-00	FILM	330PF		50V
C620	1-136-165-00	FILM	0.1uF		50V
C621	1-136-153-00	FILM	0.01uF		50V
		<CONNECTOR>			
CN102	#1-770-420-11	CONNECTOR 9P			
CN103	#1-770-420-11	CONNECTOR 9P			
		<DIODE>			
D1	8-719-210-21	DIODE 11EQS04			
D601	8-719-210-21	DIODE 11EQS04			
D602	8-719-210-21	DIODE 11EQS04			
D603	8-719-911-19	DIODE 1SS119			
D605	8-719-929-15	DIODE HZS9.1NB2			
D606	8-719-986-73	DIODE RB441QT-77			
D607	8-719-986-73	DIODE RB441QT-77			
D610	8-719-929-72	DIODE HZS33NB2			
		<IC>			
IC101	8-759-112-09	IC UPC78N12H			
IC102	8-759-332-30	IC MC34262P			
IC103	8-759-332-29	IC M51945BL			
IC601	8-759-298-87	IC CXA8038P			
		<TRANSISTOR>			
Q151	8-729-199-82	TRANSISTOR 2SD774-2			
Q601	8-729-205-02	TRANSISTOR 2SB810-H			
Q602	8-729-205-02	TRANSISTOR 2SB810-H			
Q603	8-729-199-82	TRANSISTOR 2SD774-2			
Q604	8-729-900-80	TRANSISTOR DTC114ES			
		<RESISTOR>			
R181	1-247-863-91	CARBON	22K		1/4W
R182	1-249-431-11	CARBON	15K		1/4W
R183	1-249-401-11	CARBON	47		1/4W

SWITCHING REGULATOR

Ref.No	Part No.	Description		Remark
R184	1-249-427-11	CARBON	6.8K	1/4W
R185	1-249-437-11	CARBON	47K	1/4W
R186	1-249-441-11	CARBON	100K	1/4W
R187	1-247-425-11	CARBON	4.7K	1/4W
R601	1-249-389-11	CARBON	4.7	1/4W
R602	1-247-425-11	CARBON	4.7K	1/4W
R603	1-249-389-11	CARBON	4.7	1/4W
R604	1-247-425-11	CARBON	4.7K	1/4W
R605	1-247-791-91	CARBON	22	1/4W
R615	1-247-423-11	CARBON	3.3K	1/4W
R616	1-247-421-11	CARBON	2.2K	1/4W
R617	1-249-432-11	CARBON	18K	1/4W
R618	1-247-425-11	CARBON	4.7K	1/4W
R619	1-247-421-11	CARBON	2.2K	1/4W
R620	1-249-426-11	CARBON	5.6K	1/4W
R624	1-249-429-11	CARBON	10K	1/4W
R630	1-247-425-11	CARBON	4.7K	1/4W
R640	1-247-887-00	CARBON	220K	1/4W
R641	1-249-431-11	CARBON	15K	1/4W
		<VARIABLE RESISTOR>		
RV1	1-237-503-21	RES, VER, CARBON 10K		
RV601	1-237-445-11	RES, VER, CARBON 5.0K		
		<TRANSFORMER>		
T601	1-426-931-11	TRANSFORMER		
	1-655-575-11	D BOARD *******		
	*1-949-413-11	HARNESS HA-APS28-C		
		<CAPASITOR>		
C207	1-124-910-11	ELECT	47uF	50V
C210	1-124-122-11	ELECT	100uF	50V
C211	1-124-910-11	ELECT	47uF	50V
C214	1-136-165-00	FILM	0.1uF	50V
C215	1-130-475-00	FILM	2200PF	50V
C311	1-130-016-00	FILM	680PF	50V
C312	1-161-925-00	CERAMIC	100PF	500V
C313	1-136-165-00	FILM	0.1uF	50V
C314	1-124-910-11	ELECT	47uF	50V
C315	1-124-927-11	ELECT	4.7uF	50V
C316	1-130-481-00	FILM	6800PF	50V
C317	1-124-910-11	ELECT	47uF	50V
C322	1-162-117-00	CERAMIC	100PF	
C401	1-136-165-00	FILM	0.1uF	50V
C402	1-124-927-11	ELECT	4.7uF	50V
C403	1-124-927-11	ELECT	4.7uF	50V
C404	1-130-481-00	FILM	6800PF	50V
C405	1-124-910-11	ELECT	47uF	50V
C407	1-130-479-00	FILM	4700PF	50V
C411	1-162-117-00	CERAMIC	100PF	
		<CONNECTOR>		
CNP1	*1-770-420-11	CONNECTOR 9P		
CNP201	*1-770-419-11	CONNECTOR 6P		
		<DIODE>		
D203	8-719-982-20	DIODE HZS30NB2		
D205	8-719-911-19	DIODE 1SS119		
D206	8-719-010-38	DIODE HZS5.1NB2		
D304	8-719-930-85	DIODE HZS12NB3		
D404	8-719-110-13	DIODE HZS9.1NB2		

Ref.No	Part No.	Description		Remark
		<IC>		
IC201	8-759-991-16	IC BA10358		
IC203	8-759-321-95	IC HA17431PA		
IC301	8-759-332-12	IC HA16114P		
IC401	8-759-332-12	IC HA16114P		
		<TRANSISTOR>		
Q202	8-729-119-78	TRANSISTOR 2SC2785TP-J		
		<RESISTOR>		
R1	1-249-429-11	CARBON	10K	1/4W
R2	1-249-417-11	CARBON	1K	1/4W
R3	1-215-449-00	METAL OXIDE	15K	1/4W
R205	1-249-429-11	CARBON	10K	1/4W
R206	1-249-425-11	CARBON	4.7K	1/4W
R207	1-249-413-11	CARBON	470	1/4W
R208	1-249-413-11	CARBON	470	1/4W
R209	1-249-425-11	CARBON	4.7K	1/4W
R210	1-249-425-11	CARBON	4.7K	1/4W
R214	1-249-429-11	CARBON	10K	1/4W
R215	1-249-435-11	CARBON	33K	1/4W
R217	1-215-451-00	METAL OXIDE	18K	1/4W
R219	1-215-457-00	METAL OXIDE	33K	1/4W
R223	1-215-443-00	METAL OXIDE	8.2K	1/4W
R228	1-247-903-00	CARBON	1M	1/4W
R250	1-215-437-00	METAL OXIDE	4.7K	1/4W
R251	1-215-437-00	METAL OXIDE	4.7K	1/4W
R311	1-124-857-91	CARBON	12K	1/4W
R312	1-249-441-11	CARBON	100K	1/4W
R315	1-215-446-00	METAL OXIDE	11K	1/4W
R316	1-215-451-00	METAL OXIDE	18K	1/4W
R317	1-249-421-11	CARBON	2.2K	1/4W
R318	1-247-893-11	CARBON	390K	1/4W
R321	1-249-409-11	CARBON	220	1/4W
R401	1-215-446-00	METAL OXIDE	11K	1/4W
R402	1-215-451-00	METAL OXIDE	18K	1/4W
R403	1-249-421-11	CARBON	2.2K	1/4W
R404	1-247-893-11	CARBON	390K	1/4W
R407	1-249-409-11	CARBON	220	1/4W
R409	1-249-441-11	CARBON	100K	1/4W
	*1-655-667-11	I BOARD *******		
	1-533-217-31	FUSE HOLDER		
	1-533-217-31	FUSE HOLDER		
	1-580-375-11	3P INLET 250V 10A		
		<FUSE>		
F101	1-576-231-11	H.B.C FUSE 4A 250V		
F102	1-576-231-11	H.B.C FUSE 4A 250V		
	*1-655-573-12	M BOARD *******		
		<CAPASITOR>		
C101	1-107-973-11	FILM	0.22uF	250V
C104	1-107-973-11	FILM	0.22uF	250V
C105	1-161-742-00	CERAMIC	2200PF	400V
C108	1-161-973-00	CERAMIC	220PF	400V
C110	1-161-973-00	CERAMIC	220PF	400V
C113	1-110-652-11	FILM	0.015uF	700V
C115	1-136-153-00	FILM	0.01uF	
C116	1-136-153-00	FILM	0.01uF	

SWITCHING REGULATOR

Ref.No	Part No.	Description		Remark
C118	1-130-471-00	FILM	1000PF	50V
C119	1-130-471-00	FILM	1000PF	50V
C122	1-161-742-00	CERAMIC	2200PF	400V
C126	1-124-122-11	ELECT	100uF	50V
C130	1-107-785-11	FILM	0.47MF	
C151	1-110-650-11	ELECT	180uF	450V
C152	1-107-787-11	FILM	0.22MF	
C153	1-107-785-11	FILM	0.47MF	
C154	1-107-785-11	FILM	0.47MF	
C193	1-136-153-00	FILM	0.01uF	
C201	1-110-608-11	ELECT	1500uF	35V
C202	1-110-608-11	ELECT	1500uF	35V
C203	1-164-477-91	CERAMIC	1000PF	500V
C205	1-126-104-11	ELECT	470uF	35V
C223	1-164-477-91	CERAMIC	1000PF	500V
C318	1-124-604-00	ELECT	330uF	10V
C321	1-124-472-11	ELECT	470uF	10V
C408	1-124-600-00	ELECT	270uF	25V
C410	1-124-480-11	ELECT	470uF	25V
		<CONNECTOR>		
CN101	#1-560-549-00	PIN (WITH V CONNECTOR BASE)		
CN202	#1-560-890-00	CONNECTOR PIN 2P		
		<DIODE>		
D101	8-719-510-22	DIODE D3SB60		
D102	8-719-200-92	DIODE 11EQS10		
D103	8-719-982-20	DIODE HZS30NB2		
D104	8-719-313-16	DIODE AU02A		
D105	8-719-313-16	DIODE AU02A		
D110	8-719-029-04	DIODE D5L60		
D201	8-719-050-57	DIODE F25P09QS		
D202	8-719-050-57	DIODE F25P09QS		
D301	8-719-052-37	DIODE F10P04Q		
D302	8-719-120-78	DIODE HZS6.2NB2		
D303	8-719-911-19	DIODE 1SS119		
D401	8-719-052-37	DIODE F10P04Q		
D402	8-719-110-49	DIODE HZS18NB2		
D403	8-719-911-19	DIODE 1SS119		
		<COIL>		
L1	1-424-482-11	COIL (SN8D-500)		
L2	1-424-482-11	COIL (SN8D-500)		
L101	1-411-186-11	COIL, CHOKE PQ-2625		
L301	1-411-185-11	COIL, CHOKE 50uH		
L302	1-424-255-11	COIL, CHOKE 10uH		
L401	1-411-185-11	COIL, CHOKE 50uH		
L402	1-424-255-11	COIL, CHOKE 10uH		
		<FILTER>		
LF102	1-423-740-11	LFT HR-28-E702		
LF103	1-421-622-11	TRANS, LINE FILTER S3-3082		
		<PHOTO INTERRUPTER>		
PH101	8-749-010-64	PHOTO COUPLER PC123FY2		
PH102	8-749-010-64	PHOTO COUPLER PC123FY2		
		<TRANSISTOR>		
Q101	8-729-024-28	TRANSISTOR 2SK2234		
Q102	8-729-024-28	TRANSISTOR 2SK2234		
Q103	8-729-024-28	TRANSISTOR 2SK2234		
Q302	8-729-322-37	TRANSISTOR 2SJ175		
Q401	8-729-322-37	TRANSISTOR 2SJ175		

Ref.No	Part No.	Description		Remark
		<RESISTOR>		
R101	1-260-134-11	CARBON	820K	1/2W
R107	1-249-417-11	CARBON	1K	1/4W
R109	1-247-901-11	CARBON	820K	1/4W
R110	1-247-901-11	CARBON	820K	1/4W
R111	1-215-902-11	METAL	47K	2W
R112	1-215-902-11	METAL	47K	2W
R113	1-247-863-91	CARBON	22K	1/4W
R114	1-247-863-91	CARBON	22K	1/4W
R115	1-216-361-00	METAL	0.22	2W
R116	1-216-361-00	METAL	0.22	2W
R117	1-247-901-11	CARBON	820K	1/4W
R118	1-249-399-11	CARBON	33	1/4W
R119	1-218-642-11	METAL	100K	1W
R120	1-218-642-11	METAL	100K	1W
R129	1-247-791-91	CARBON	22	1/4W
R131	1-218-191-11	METAL	0.1	1W
R132	1-247-901-11	CARBON	820K	1/4W
R133	1-247-901-11	CARBON	820K	1/4W
R134	1-247-901-11	CARBON	820K	1/4W
R140	1-219-213-11	FUSE	0.033	0.33W
R141	1-249-397-11	CARBON	22	1/4W
R236	1-215-861-00	METAL	47	1W
R280	1-249-425-11	CARBON	4.7K	1/4W
R320	1-218-191-11	METAL	0.1	1W
R322	1-215-445-00	METAL	10K	1/4W
R323	1-215-445-00	METAL	10K	1/4W
R330	1-247-887-00	CARBON	220K	1/4W
R331	1-247-887-00	CARBON	220K	1/4W
R350	1-218-191-11	METAL	0.1	1W
R406	1-218-191-11	METAL	0.1	1W
R410	1-215-445-00	METAL	10K	1/4W
R411	1-215-428-00	METAL	2K	1/4W
R450	1-218-191-11	METAL	0.1	1W
		<VARIABLE RESISTOR>		
RV201	1-237-445-11	RES, VER, CARBON	5.0K	
		<SWITCH>		
S101	1-554-880-11	PUSH SWITCH (AC POWER) 1 KEY)		
		<TRANSFORMER>		
T101	1-427-821-11	TRANSFORMER		
		<THERMISTOR>		
TH101	1-809-430-11	THERMISTOR 10D-11		
		<VARISTOR>		
V101	1-519-470-11	DISCHARGE		
VDR101	1-809-337-11	VARISTOR		
		<SWITCH>		
TS201	1-570-258-22	SWITCH, THERMAL REED		

****

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

Ref.No	Part No.	Description	Remark
		<MISCELLANEOUS>	
⚠#	1-468-002-11	SWITCHING REGULATOR(SOPS-1088)	
	1-500-197-11	HEAD, THERMAL (LV5414)	
	1-554-512-00	SWITCH, MICRO	
	1-769-536-11	WIRE(FLAT TYPE)(26 CORE)	
#	1-949-468-11	HARNESS (B)	
#	1-949-471-11	HARNESS (E)	
		**********	
		<ACCESSORY & PACKING MATERIALS>	
	1-551-475-31	CABLE ASSY	
⚠	1-551-631-22	CORD, POWER (UP-890CE)	
⚠	1-558-527-11	CORD, POWER (UP-890MD)	
	1-693-002-11	REMOTE COMMANDER (RM-91) (UP-890MD)	
#	3-173-904-02	CUSHION	
#	3-187-322-01	INDIVIDUAL CARTON (UP-890CE)	
#	3-187-324-01	INDIVIDUAL CARTON (UP-890MD)	
	3-798-008-11	MANUAL, INSTRUCTION (UP-890CE)	
⚠	3-798-008-11	MANUAL, INSTRUCTION (UP-890MD)	
		**********	
		<HARDWARE LIST>	
	7-621-255-55	SCREW +P 2X8	
	7-627-556-08	SCREW +P 2.6X2.8	
	7-628-253-95	SCREW +PS 2.6X4	
	7-682-645-04	SCREW +PS 3X4	
	7-682-647-01	SCREW +PS 3X6	
	7-685-546-14	SCREW +BTP 3X8 TYPE2 N-S	
	7-685-546-19	SCREW +BTP 3X8 TYPE2 N-S	
	7-685-871-01	SCREW +BVTT 3X6 (S)	
		**********	

Ref.No	Part No.	Description	Remark

SONY

VIDEO GRAPHIC PRINTER

UP-890CE
UP-890MD

SERVICE MANUAL

SUPPLEMENT-1

Please add and replace your manual with this SUPPLEMENT-1.

SUBJECT

- Part number suffix changes of MA-19 board.

MA board Part No. against the Serial No. for the set.

	Serial No.	Part No.
UP-890CE	16501 through 25100	1-655-122-21, 22
	25101 and Higher	1-655-122-23
UP-890MD	15801~29100	1-655-122-21, 22
	29101 and Higher	1-655-122-23

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

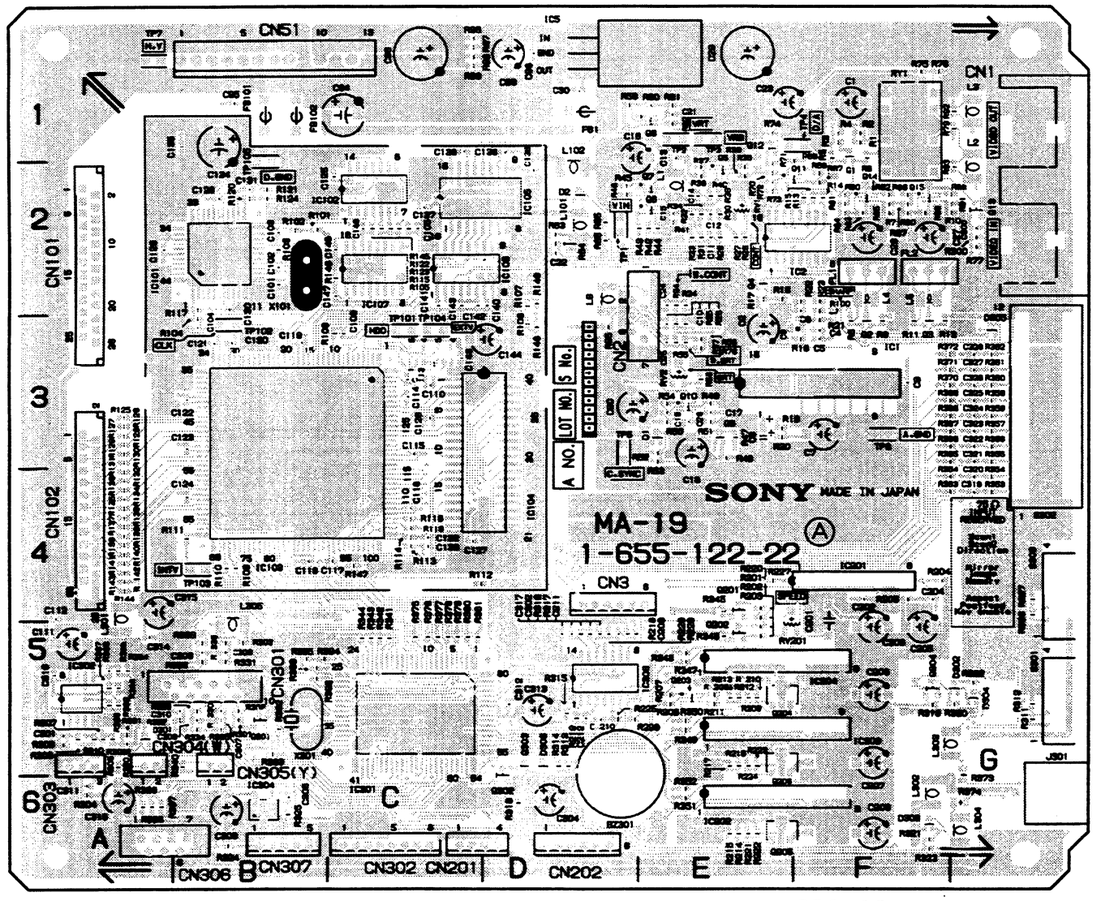
- **For Schematic Diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/10W unless otherwise noted.
  kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted.
  pF: μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- NM: No Mount.

Note: The components identified by mark ⚠ are critical for safety. Replace only with part number specified.

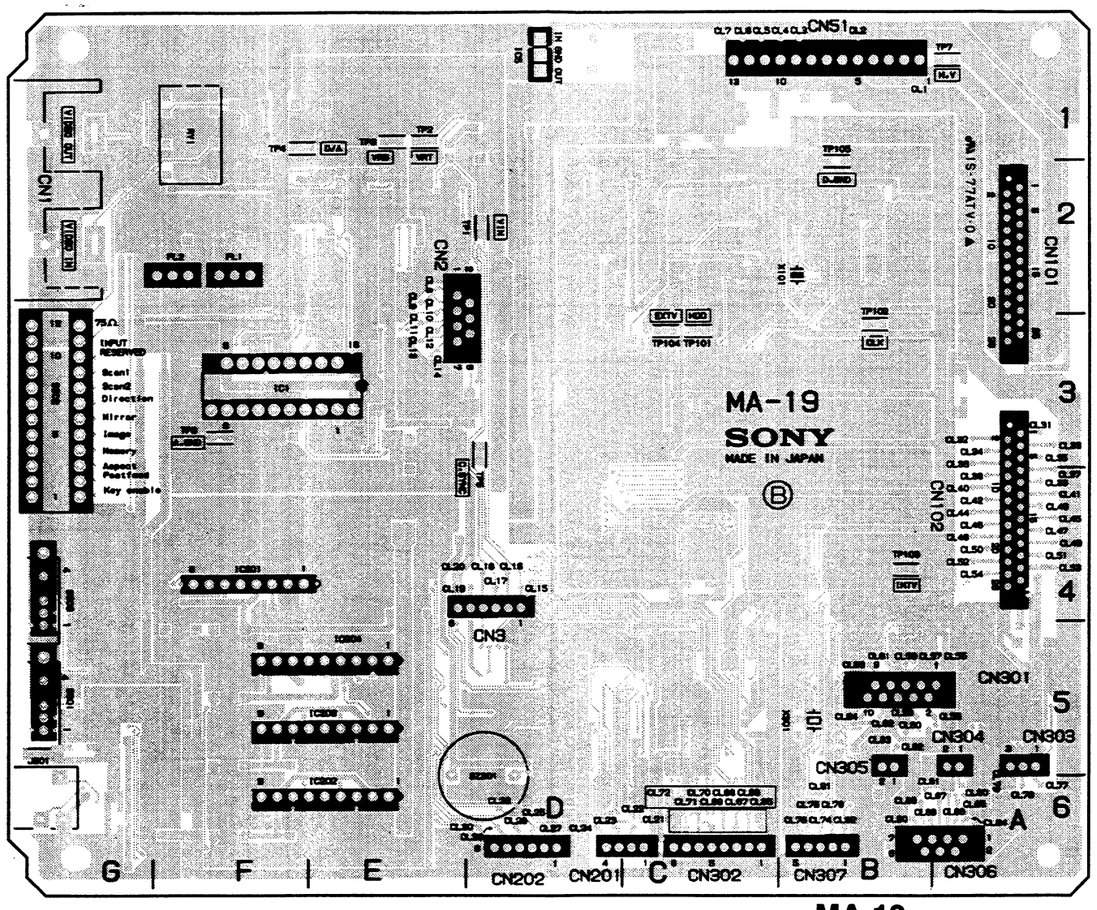
Note: Les composants identifiés par une marque ⚠ sont d'une importance critique pour la sécurité. Ne les remplacer que par des pièces de numéro spécifié.

DIAGRAMS

MA-19 BOARD (-21, 22)



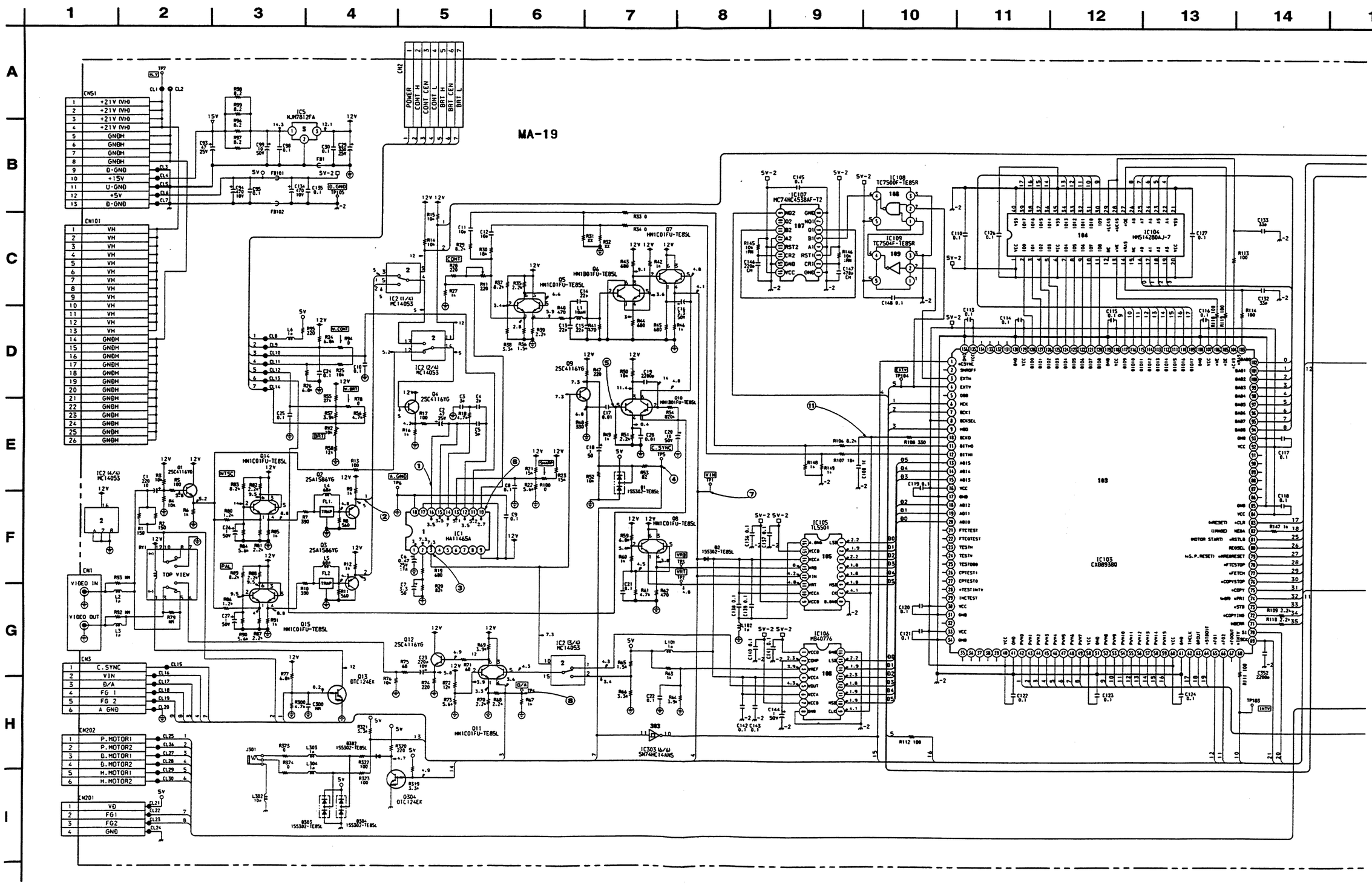
MA-19 -COMPONENT SIDE-
1-655-122-21, 22



MA-19 -SOLDERING SIDE-
1-655-122-21, 22

MA-19 BOARD (-21, 22)

BZ301	D-6	D302	G-5	IC108	C-3	L303	F-5	Q205	E-6
		D303	F-6	IC109	C-3	L304	G-6	Q206	E-5
CN1	G-1	D304	G-5	IC201	F-4	L305	B-5	Q301	B-5
CN2	D-3	D305	G-3	IC202	E-6			Q302	D-5
CN3	D-4	D306	D-5	IC203	E-5	Q1	F-1	Q303	D-5
CN51	B-1			IC204	E-5	Q2	E-1	Q304	F-5
CN101	A-2	FB1	D-1	IC301	C-5	Q3	F-3		
CN102	A-4	FB101	B-1	IC302	A-5	Q4	E-2	RV1	E-2
CN201	C-6	FB102	B-1	IC303	D-5	Q5	E-2	RV2	E-3
CN202	D-6			IC304	B-6	Q6	E-2	RV201	E-5
CN301	B-5	FL1	F-2			Q7	E-2		
CN302	C-6	FL2	F-2	J301	G-6	Q8	E-1	RY1	F-1
CN303	A-5					Q9	E-3		
CN304	A-5	IC1	F-3	L1	E-2	Q10	E-3	S301	G-5
CN305	B-5	IC2	E-2	L2	G-2	Q11	E-2	S302	G-4
CN306	B-6	IC5	D-1	L3	G-1	Q12	E-1	S303	G-4
CN307	B-6	IC101	B-2	L4	F-2	Q13	G-2		
		IC102	C-2	L5	F-2	Q14	F-2	X101	B-2
D1	E-3	IC103	B-4	L6	D-2	Q15	F-2	X301	B-5
D2	D-2	IC104	D-4	L101	D-2	Q201	E-4		
D201	D-5	IC105	C-2	L102	D-2	Q202	E-5		
D202	D-5	IC106	C-2	L301	A-5	Q203	E-5		
D301	A-5	IC107	C-2	L302	A-6	Q204	E-5		


MA-19
CN51
CN101
CN1
CN2
CN3
CN202
CN201
IC5 NJM7812FA
IC1 HA11465A
IC2 (1/6) MC14053
IC2 (2/6) MC14053
IC2 (3/6) MC14053
IC2 (4/6) MC14053
IC107 MC74HC4538AF-T2
IC108 TC7S00F-TE85R
IC109 TC7S04F-TE85R
IC104 HM514280AJ-7
IC105 TL5501
IC106 MB40776
IC103 CXD09380
IC303 (6/6) 5074HC14ANS
TOP VIEW
VIDEO IN
VIDEO OUT
POWER
CONT H
CONT CEN
CONT L
BAT H
BAT CEN
BAT L
+21V (VH)
GNDH
+15V
U-GND
+5V
D-GND
VH
C.SYNC
VIN
D/A
FG 1
FG 2
A GND
P.MOTOR1
P.MOTOR2
D.MOTOR1
D.MOTOR2
H.MOTOR1
H.MOTOR2
VD
FG1
FG2
GND

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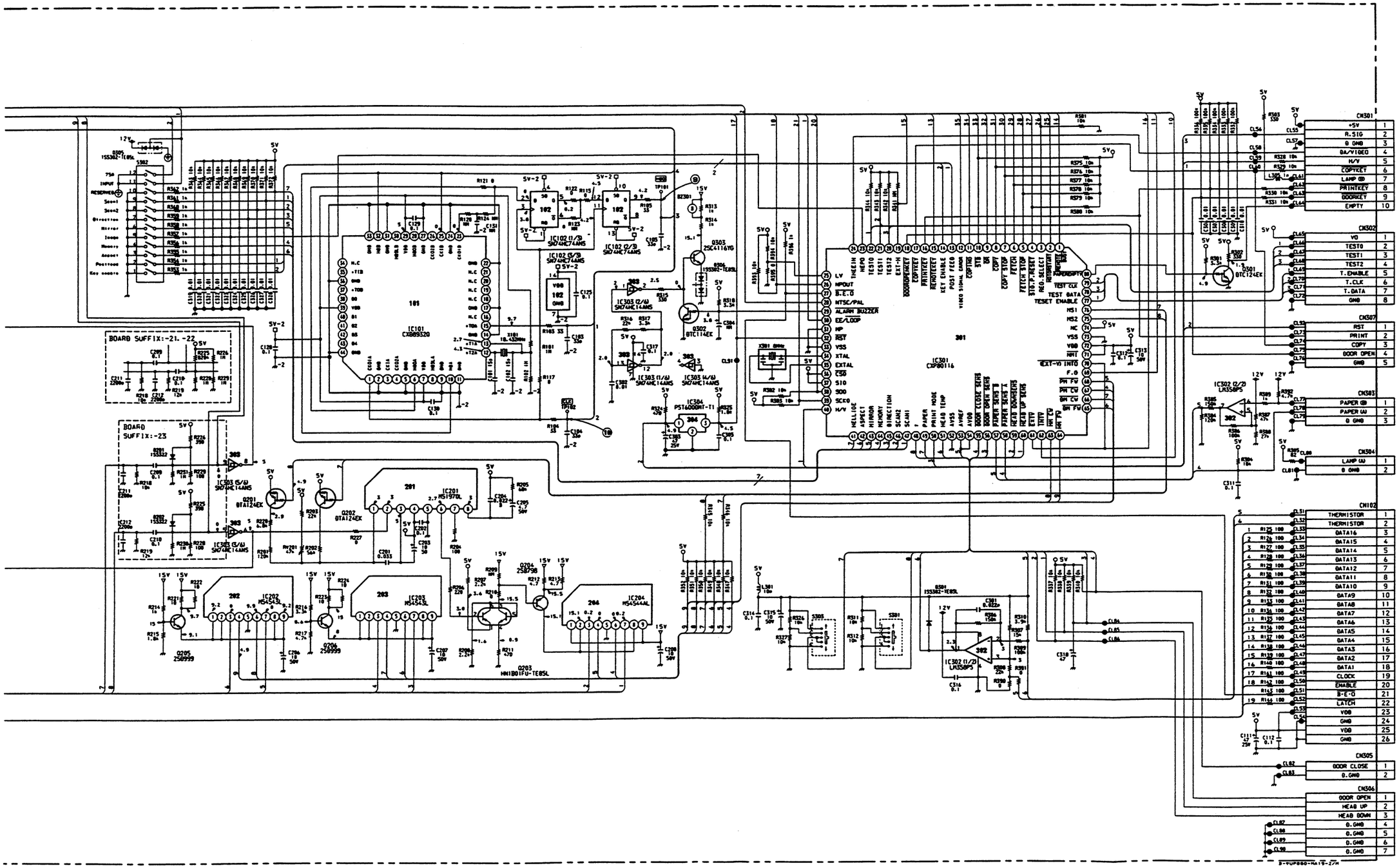
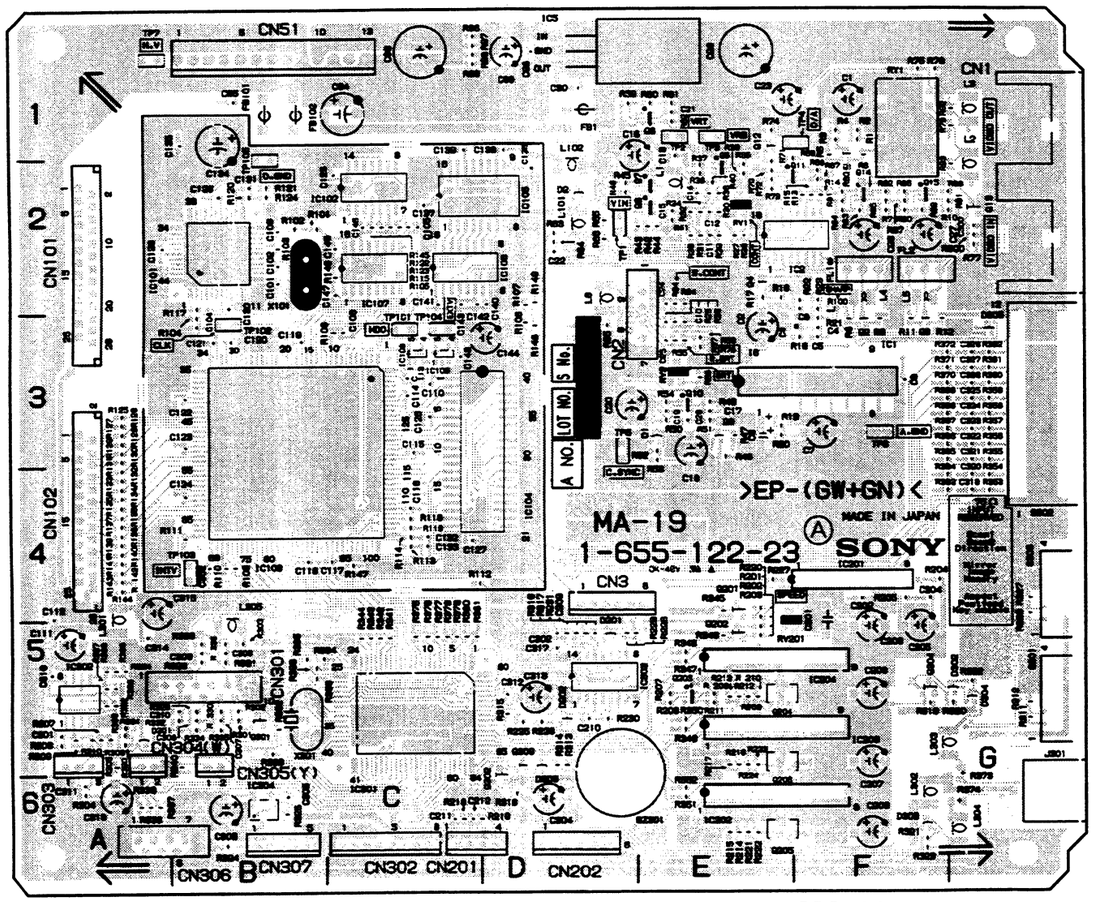


MA-19 BOARD (-23)



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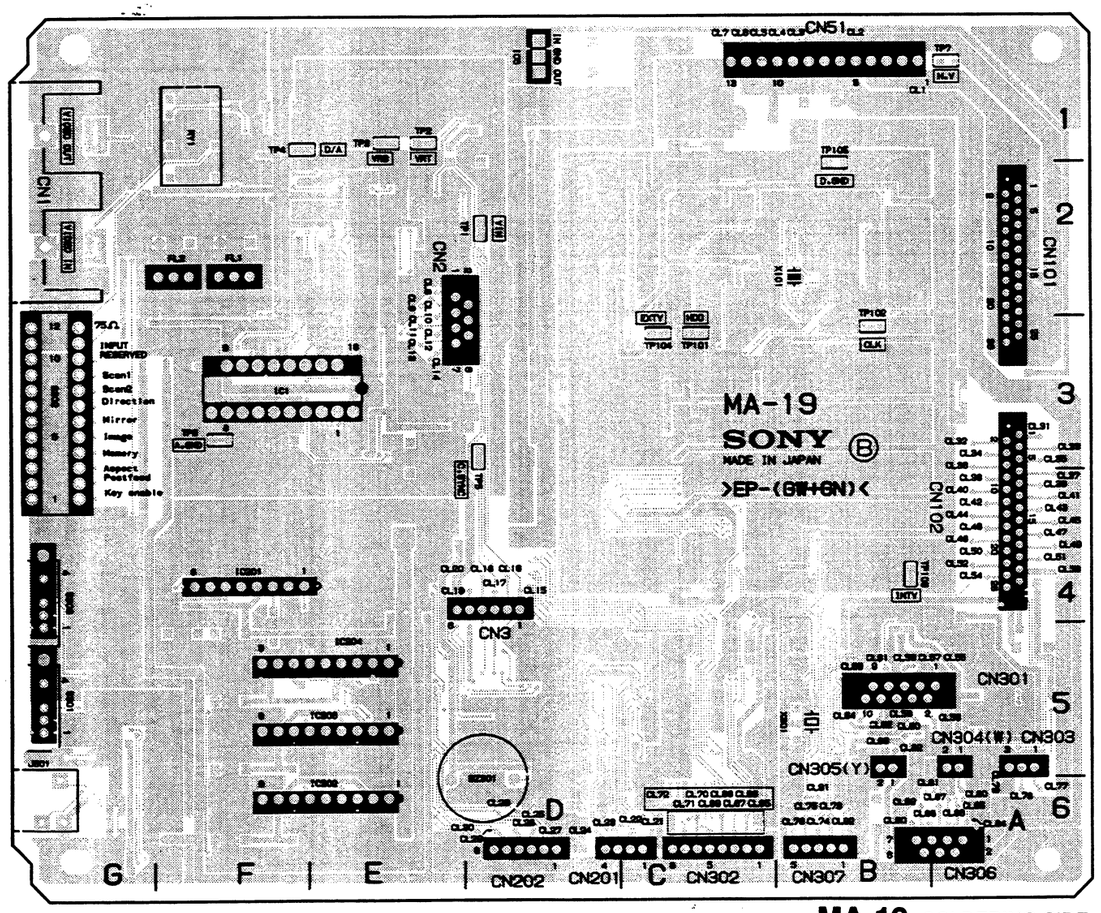
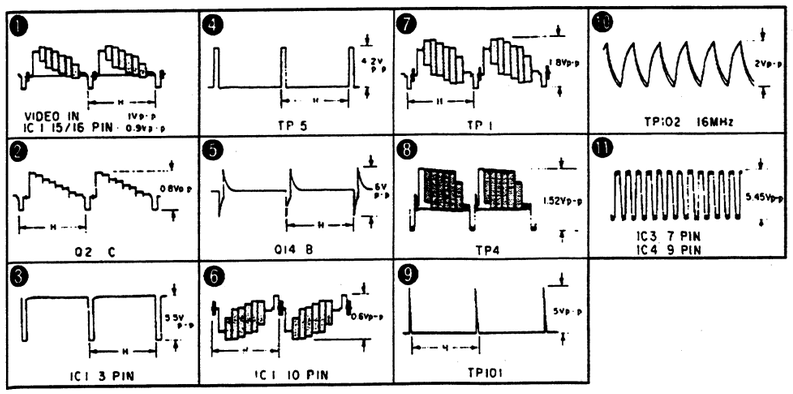
1-655-122-23



MA-19 -SOLDERING SIDE-
1-655-122-23



MA-19 BOARD (-23)

BZ301	D-6	D302	G-5	IC108	C-3	L303	F-5	Q205	E-6
		D303	F-6	IC109	C-3	L304	G-6	Q206	E-5
CN1	G-1	D304	G-5	IC201	F-4	L305	B-5	Q301	B-5
CN2	D-3	D305	G-3	IC202	E-6			Q302	D-5
CN3	D-4	D306	D-5	IC203	E-5	Q1	F-1	Q303	D-5
CN51	B-1			IC204	E-5	Q2	E-1	Q304	F-5
CN101	A-2	FB1	D-1	IC301	C-5	Q3	F-3		
CN102	A-4	FB101	B-1	IC302	A-5	Q4	E-2	RV1	E-2
CN201	C-6	FB102	B-1	IC303	D-5	Q5	E-2	RV2	E-3
CN202	D-6			IC304	B-6	Q6	E-2	RV201	E-5
CN301	B-5	FL1	F-2			Q7	E-2		
CN302	C-6	FL2	F-2	J301	G-6	Q8	E-1	RY1	F-1
CN303	A-5					Q9	E-3		
CN304	A-5	IC1	F-3	L1	E-2	Q10	E-3	S301	G-5
CN305	B-5	IC2	E-2	L2	G-2	Q11	E-2	S302	G-4
CN306	B-6	IC5	D-1	L3	G-1	Q12	E-1	S303	G-4
CN307	B-6	IC101	B-2	L4	F-2	Q13	G-2		
		IC102	C-2	L5	F-2	Q14	F-2	X101	B-2
D1	E-3	IC103	B-4	L6	D-2	Q15	F-2	X301	B-5
D2	D-2	IC104	D-4	L101	D-2	Q201	E-4		
D201	D-5	IC105	C-2	L102	D-2	Q202	E-5		
D202	D-5	IC106	C-2	L301	A-5	Q203	E-5		
D301	A-5	IC107	C-2	L302	A-6	Q204	E-5		

SECTION 7
ELECTRICAL PARTS LIST

7-1. Parts Information

- Safety Related Components Warning
  components identified by ⚠ marking on the schematic diagrams and repair parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

- Replacement Parts supplied from Sony Parts center will sometimes have a different shape from the original parts.
  This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts". This manual's repair parts list indicates the parts numbers of "the standardized genuine parts at present".
  Regarding engineering parts changes in our engineering department refer to Sony service bullentins and service manual supplements.

- Items marked "o" in the SP column of the parts list are not stocked since they are seldom required for routine service.
  Some delay should be anticipated when ordering these items.

- Abbreviations

Ref. No.	Description
C□□, CV□□	CAPACITOR
R□□, RV□□	RESISTOR

- Units for Capacitors, Inductors and Resistors.
  The following units are assumed in schematic diagrams and repair parts list unless otherwise specified.
  Capacitors : μF or pF
  Inductors : μH
  Resistors : Ω

MA-19 BOARD

Ref. No. or Q'ty	Part No.	Description
1pc	*A-8265-924-B	MOUNTED CIRCUIT BOARD, MA-19
BZ301	1-529-080-11	BUZZER, PIEZOELECTRIC
C1	1-126-923-11	ELECT 220uF 20% 10V
C2	1-104-664-11	ELECT 47uF 20% 25V
C3	1-163-220-11	CERAMIC 3PF 0.25PF 50V
C4	1-162-907-11	CERAMIC, CHIP 2PF 50V
C5	1-162-910-11	CERAMIC 5PF 0.25PF 50V
C6	1-135-145-11	TANTALUM, CHIP 0.47uF 10% 35V
C7	1-126-962-11	ELECT 3.3uF 20% 50V
C8	1-164-156-11	CERAMIC 0.1uF 25V
C9	1-164-156-11	CERAMIC 0.1uF 25V
C10	1-164-156-11	CERAMIC 0.1uF 25V
C11	1-162-915-11	CERAMIC, CHIP 10PF 0.5PF 50V
C12	1-162-915-11	CERAMIC, CHIP 10PF 0.5PF 50V
C13	1-162-919-11	CERAMIC, CHIP 22PF 5% 50V
C14	1-162-919-11	CERAMIC, CHIP 22PF 5% 50V
C15	1-162-919-11	CERAMIC, CHIP 22PF 5% 50V
C16	1-126-962-11	ELECT 3.3uF 20% 50V
C17	1-162-974-11	CERAMIC 0.01uF 50V
C18	1-124-903-11	ELECT 1uF 20% 50V
C19	1-162-966-11	CERAMIC, CHIP 0.0022uF 10% 50V
C20	1-126-964-11	ELECT 10uF 20% 50V
C21	1-164-156-11	CERAMIC 0.1uF 25V
C22	1-164-156-11	CERAMIC 0.1uF 25V
C23	1-126-923-11	ELECT 220uF 20% 10V
C24	1-164-156-11	CERAMIC 0.1uF 25V
C25	1-164-156-11	CERAMIC 0.1uF 25V
C26	1-124-903-11	ELECT 1uF 20% 50V
C27	1-124-903-11	ELECT 1uF 20% 50V
C28	1-162-974-11	CERAMIC 0.01uF 50V
C29	1-126-940-11	ELECT 330uF 20% 25V
C30	1-164-156-11	CERAMIC 0.1uF 25V
C93	1-104-664-11	ELECT 47uF 20% 25V
C94	1-126-925-11	ELECT 470uF 20% 10V
C95	1-164-156-11	CERAMIC 0.1uF 25V
C98	1-164-156-11	CERAMIC 0.1uF 25V
C99	1-126-964-11	ELECT 10uF 20% 50V
C101	1-162-917-11	CERAMIC, CHIP 15PF 5% 50V
C102	1-162-917-11	CERAMIC, CHIP 15PF 5% 50V
C103	1-162-921-11	CERAMIC, CHIP 33PF 5% 50V
C104	1-162-921-11	CERAMIC, CHIP 33PF 5% 50V
C105	1-162-921-11	CERAMIC, CHIP 33PF 5% 50V
C108	1-216-821-11	METAL, CHIP 1K 5% 1/16W
C110	1-164-156-11	CERAMIC 0.1uF 25V
C111	1-104-664-11	ELECT 47uF 20% 25V
C112	1-164-156-11	CERAMIC 0.1uF 25V
C113	1-164-156-11	CERAMIC 0.1uF 25V
C114	1-164-156-11	CERAMIC 0.1uF 25V
C115	1-164-156-11	CERAMIC 0.1uF 25V
C116	1-164-156-11	CERAMIC 0.1uF 25V
C117	1-164-156-11	CERAMIC 0.1uF 25V
C118	1-164-156-11	CERAMIC 0.1uF 25V
C119	1-164-156-11	CERAMIC 0.1uF 25V
C120	1-164-156-11	CERAMIC 0.1uF 25V
C121	1-164-156-11	CERAMIC 0.1uF 25V
C122	1-164-156-11	CERAMIC 0.1uF 25V

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Ref. No. or Q'ty	Part No.	Description
C123	1-164-156-11	CERAMIC 0.1uF 25V
C124	1-164-156-11	CERAMIC 0.1uF 25V
C125	1-164-156-11	CERAMIC 0.1uF 25V
C126	1-164-156-11	CERAMIC 0.1uF 25V
C127	1-164-156-11	CERAMIC 0.1uF 25V
C128	1-164-156-11	CERAMIC 0.1uF 25V
C129	1-164-156-11	CERAMIC 0.1uF 25V
C130	1-164-156-11	CERAMIC 0.1uF 25V
C132	1-162-921-11	CERAMIC, CHIP 33PF 5% 50V
C133	1-162-921-11	CERAMIC, CHIP 33PF 5% 50V
C134	1-126-925-11	ELECT 470uF 20% 10V
C135	1-164-156-11	CERAMIC 0.1uF 25V
C136	1-164-156-11	CERAMIC 0.1uF 25V
C137	1-164-156-11	CERAMIC 0.1uF 25V
C138	1-164-156-11	CERAMIC 0.1uF 25V
C139	1-164-156-11	CERAMIC 0.1uF 25V
C140	1-164-156-11	CERAMIC 0.1uF 25V
C141	1-164-156-11	CERAMIC 0.1uF 25V
C142	1-164-156-11	CERAMIC 0.1uF 25V
C143	1-164-156-11	CERAMIC 0.1uF 25V
C144	1-124-903-11	ELECT 1uF 20% 50V
C145	1-164-156-11	CERAMIC 0.1uF 25V
C146	1-162-957-11	CERAMIC 220PF 5% 50V
C147	1-164-315-11	CERAMIC 470PF 5% 50V
C148	1-164-156-11	CERAMIC 0.1uF 25V
C201	1-130-489-00	MYLAR 0.033uF 5% 50V
C202	1-164-156-11	CERAMIC 0.1uF 25V
C203	1-126-964-11	ELECT 10uF 20% 50V
C204	1-164-227-11	CERAMIC 0.022uF 10% 25V
C205	1-126-963-11	ELECT 4.7uF 20% 50V
C206	1-126-964-11	ELECT 10uF 20% 50V
C207	1-126-964-11	ELECT 10uF 20% 50V
C208	1-126-964-11	ELECT 10uF 20% 50V
C209	1-164-156-11	CERAMIC 0.1uF 25V
C210	1-164-156-11	CERAMIC 0.1uF 25V
C211	1-162-966-11	CERAMIC, CHIP 0.0022uF 10% 50V
C212	1-162-966-11	CERAMIC, CHIP 0.0022uF 10% 50V
C301	1-164-227-11	CERAMIC 0.022uF 10% 25V
C302	1-162-970-11	CERAMIC, CHIP 0.01uF 10% 25V
C303	1-104-664-11	ELECT 47uF 20% 25V
C305	1-164-156-11	CERAMIC 0.1uF 25V
C306	1-162-974-11	CERAMIC 0.01uF 50V
C307	1-162-974-11	CERAMIC 0.01uF 50V
C308	1-162-974-11	CERAMIC 0.01uF 50V
C309	1-162-974-11	CERAMIC 0.01uF 50V
C310	1-162-974-11	CERAMIC 0.01uF 50V
C311	1-164-156-11	CERAMIC 0.1uF 25V
C312	1-164-156-11	CERAMIC 0.1uF 25V
C313	1-126-964-11	ELECT 10uF 20% 50V
C314	1-164-156-11	CERAMIC 0.1uF 25V
C315	1-126-964-11	ELECT 10uF 20% 50V
C316	1-164-156-11	CERAMIC 0.1uF 25V
C317	1-164-156-11	CERAMIC 0.1uF 25V
C318	1-104-664-11	ELECT 47uF 20% 25V
C319	1-162-974-11	CERAMIC 0.01uF 50V

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Ref. No. or Q'ty	Part No.	Description
C320	1-162-974-11	CERAMIC 0.01uF 50V
C321	1-162-974-11	CERAMIC 0.01uF 50V
C322	1-162-974-11	CERAMIC 0.01uF 50V
C323	1-162-974-11	CERAMIC 0.01uF 50V
C324	1-162-974-11	CERAMIC 0.01uF 50V
C325	1-162-974-11	CERAMIC 0.01uF 50V
C326	1-162-974-11	CERAMIC 0.01uF 50V
C327	1-162-974-11	CERAMIC 0.01uF 50V
C328	1-162-974-11	CERAMIC 0.01uF 50V
C352	1-162-966-11	CERAMIC, CHIP 0.0022uF 10% 50V
CN1	1-691-431-11	CONNECTOR ASSY, BNC
CN2	1-569-536-11	SOCKET, CONNECTOR 7P
CN3	*1-564-005-11	CONNECTOR 6P, MALE
CN101	*1-764-781-11	SOCKET, CONNECTOR 26P
CN102	*1-764-781-11	SOCKET, CONNECTOR 26P
CN201	1-506-469-11	CONNECTOR, 4P, MALE
CN202	1-506-471-11	CONNECTOR, 6P, MALE
CN301	1-562-719-11	SOCKET, CONNECTOR 10P
CN302	1-506-473-11	CONNECTOR, 8P, MALE
CN303	*1-506-468-11	CONNECTOR, 3P, MALE
CN304	1-506-467-11	CONNECTOR, 2P, MALE
CN305	1-506-467-11	CONNECTOR, 2P, MALE
CN306	1-569-536-11	SOCKET, CONNECTOR 7P
CN307	*1-564-004-11	PIN, CONNECTOR 5P
D1	8-719-820-41	DIODE 1SS302
D2	8-719-820-41	DIODE 1SS302
D201	8-719-031-17	DIODE 1SS322-TE85L
D202	8-719-031-17	DIODE 1SS322-TE85L
D301	8-719-820-41	DIODE 1SS302
D302	8-719-820-41	DIODE 1SS302
D303	8-719-820-41	DIODE 1SS302
D304	8-719-820-41	DIODE 1SS302
D305	8-719-820-41	DIODE 1SS302
D306	8-719-820-41	DIODE 1SS302
FB1	1-410-397-21	FERRITE BEAD INDUCTOR 1.1uH
FB101	1-410-397-21	FERRITE BEAD INDUCTOR 1.1uH
FB102	1-410-397-21	FERRITE BEAD INDUCTOR 1.1uH
FL1	1-760-578-11	TRAP, CERAMIC
FL2	1-579-348-11	TRAP, CERAMIC
IC1	8-759-304-10	IC HA11465A
IC2	8-759-300-71	IC MC14053BF
IC5	8-759-231-58	IC TA7812S
IC101	8-759-287-50	IC CXD8932Q
IC102	8-759-925-90	IC SN74HC74ANS
IC103	8-759-292-87	IC CXD8938Q
IC104	8-759-292-88	IC HM514280AJ-7
IC105	8-759-051-50	IC TL5501CDWA
IC106	8-759-051-51	IC MB40776PF
IC107	8-759-008-45	IC MC74HC4538F
IC108	8-759-231-32	IC TC7S00F
IC109	8-759-031-84	IC SC7S04F
IC201	8-759-051-52	IC M51970L
IC202	8-759-600-24	IC M54543L
IC203	8-759-600-24	IC M54543L
IC204	8-759-633-10	IC M54544AL
IC301	8-752-862-49	IC CXP80P116Q-2-279
IC302	8-759-983-69	IC LM358PS
IC303	8-759-925-80	IC SN74HC14ANS

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Ref. No. or Q'ty	Part No.	Description
IC304	8-759-278-46	IC PST600DMT-T1
J301	1-507-967-11	JACK
L1	1-408-777-00	INDUCTOR CHIP 10uH
L2	1-408-765-21	INDUCTOR CHIP 1uH
L3	1-408-765-21	INDUCTOR CHIP 1uH
L4	1-410-391-11	INDUCTOR CHIP 68uH
L5	1-410-391-11	INDUCTOR CHIP 68uH
L6	1-408-765-21	INDUCTOR CHIP 1uH
L101	1-408-765-21	INDUCTOR CHIP 1uH
L102	1-408-765-21	INDUCTOR CHIP 1uH
L301	1-408-777-00	INDUCTOR CHIP 10uH
L302	1-408-777-00	INDUCTOR CHIP 10uH
L303	1-408-765-21	INDUCTOR CHIP 1uH
L304	1-408-765-21	INDUCTOR CHIP 1uH
L305	1-408-765-21	INDUCTOR CHIP 1uH
Q1	8-729-230-63	TRANSISTOR 2SC4116YG
Q2	8-729-230-60	TRANSISTOR 2SA1586YG
Q3	8-729-230-60	TRANSISTOR 2SA1586YG
Q4	8-729-230-63	TRANSISTOR 2SC4116YG
Q5	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q6	8-729-427-74	TRANSISTOR XP4601
Q7	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q8	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q9	8-729-230-63	TRANSISTOR 2SC4116YG
Q10	8-729-427-74	TRANSISTOR XP4601
Q11	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q12	8-729-230-63	TRANSISTOR 2SC4116YG
Q13	8-729-901-00	TRANSISTOR DTC124EK
Q14	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q15	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q201	8-729-901-05	TRANSISTOR DTA124EK
Q202	8-729-901-05	TRANSISTOR DTA124EK
Q203	8-729-427-74	TRANSISTOR XP4601
Q204	8-729-101-07	TRANSISTOR 2SB798
Q205	8-729-140-75	TRANSISTOR 2SD999-CLCK
Q206	8-729-140-75	TRANSISTOR 2SD999-CLCK
Q301	8-729-901-00	TRANSISTOR DTC124EK
Q302	8-729-027-46	TRANSISTOR DTC114YKA-T146
Q303	8-729-230-63	TRANSISTOR 2SC4116YG
Q304	8-729-901-00	TRANSISTOR DTC124EK
R1	1-216-811-11	METAL, CHIP 150 5% 1/16W
R2	1-216-811-11	METAL, CHIP 150 5% 1/16W
R3	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R4	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R5	1-216-809-11	METAL, CHIP 100 5% 1/16W
R6	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R7	1-216-816-11	METAL, CHIP 390 5% 1/16W
R8	1-216-818-11	METAL, CHIP 560 5% 1/16W
R9	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R10	1-216-816-11	METAL, CHIP 390 5% 1/16W
R11	1-216-818-11	METAL, CHIP 560 5% 1/16W
R12	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R13	1-216-809-11	METAL, CHIP 100 5% 1/16W
R14	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R15	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R16	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R17	1-216-809-11	METAL, CHIP 100 5% 1/16W

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Ref. No. or Q'ty	Part No.	Description
R18	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R19	1-216-819-11	METAL, CHIP 680 5% 1/16W
R20	1-216-844-11	METAL, CHIP 82K 5% 1/16W
R21	1-216-835-11	METAL, CHIP 15K 5% 1/16W
R22	1-216-830-11	METAL, CHIP 5.6K 5% 1/16W
R23	1-216-835-11	METAL, CHIP 15K 5% 1/16W
R24	1-216-831-11	METAL, CHIP 6.8K 5% 1/16W
R25	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R26	1-216-831-11	METAL, CHIP 6.8K 5% 1/16W
R27	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R28	1-216-813-11	METAL, CHIP 220 5% 1/16W
R29	1-216-832-11	METAL, CHIP 8.2K 5% 1/16W
R30	1-216-836-11	METAL, CHIP 18K 5% 1/16W
R33	1-216-864-11	METAL, CHIP 0 5% 1/16W
R34	1-216-864-11	METAL, CHIP 0 5% 1/16W
R35	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R36	1-216-823-11	METAL, CHIP 1.5K 5% 1/16W
R37	1-216-832-11	METAL, CHIP 8.2K 5% 1/16W
R38	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R39	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R40	1-216-817-11	METAL, CHIP 470 5% 1/16W
R41	1-216-817-11	METAL, CHIP 470 5% 1/16W
R42	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R43	1-216-819-11	METAL, CHIP 680 5% 1/16W
R44	1-216-819-11	METAL, CHIP 680 5% 1/16W
R45	1-216-819-11	METAL, CHIP 680 5% 1/16W
R46	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R47	1-216-813-11	METAL, CHIP 220 5% 1/16W
R48	1-216-815-11	METAL, CHIP 330 5% 1/16W
R49	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R50	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R51	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R52	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R53	1-216-808-11	METAL, CHIP 82 5% 1/16W
R54	1-216-856-11	METAL, CHIP 820K 5% 1/16W
R55	1-216-838-11	METAL, CHIP 27K 5% 1/16W
R56	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R57	1-216-828-11	METAL, CHIP 3.9K 5% 1/16W
R58	1-216-834-11	METAL, CHIP 12K 5% 1/16W
R59	1-216-831-11	METAL, CHIP 6.8K 5% 1/16W
R60	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R61	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R62	1-216-817-11	METAL, CHIP 470 5% 1/16W
R63	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R64	1-216-828-11	METAL, CHIP 3.9K 5% 1/16W
R65	1-216-823-11	METAL, CHIP 1.5K 5% 1/16W
R66	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R67	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R68	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R69	1-216-828-11	METAL, CHIP 3.9K 5% 1/16W
R70	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R71	1-216-807-11	METAL, CHIP 68 5% 1/16W
R72	1-216-834-11	METAL, CHIP 12K 5% 1/16W
R73	1-216-830-11	METAL, CHIP 5.6K 5% 1/16W
R74	1-216-813-11	METAL, CHIP 220 5% 1/16W
R75	1-216-807-11	METAL, CHIP 68 5% 1/16W
R76	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R77	1-216-831-11	METAL, CHIP 6.8K 5% 1/16W
R78	1-216-864-11	METAL, CHIP 0 5% 1/16W

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Ref. No. or Q'ty	Part No.	Description
R80	1-216-822-11	METAL, CHIP 1.2K 5% 1/16W
R81	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R82	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R83	1-216-832-11	METAL, CHIP 8.2K 5% 1/16W
R84	1-216-830-11	METAL, CHIP 5.6K 5% 1/16W
R85	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R86	1-216-822-11	METAL, CHIP 1.2K 5% 1/16W
R87	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R88	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R89	1-216-832-11	METAL, CHIP 8.2K 5% 1/16W
R90	1-216-830-11	METAL, CHIP 5.6K 5% 1/16W
R91	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R94	1-216-864-11	METAL, CHIP 0 5% 1/16W
R95	1-216-813-11	METAL, CHIP 220 5% 1/16W
R96	1-216-796-11	METAL, CHIP 8.2 5% 1/16W
R97	1-216-796-11	METAL, CHIP 8.2 5% 1/16W
R98	1-216-796-11	METAL, CHIP 8.2 5% 1/16W
R99	1-216-796-11	METAL, CHIP 8.2 5% 1/16W
R100	1-216-864-11	METAL, CHIP 0 5% 1/16W
R101	1-216-857-11	METAL, CHIP 1M 5% 1/16W
R102	1-216-857-11	METAL, CHIP 1M 5% 1/16W
R103	1-216-803-11	METAL, CHIP 33 5% 1/16W
R104	1-216-803-11	METAL, CHIP 33 5% 1/16W
R105	1-216-803-11	METAL, CHIP 33 5% 1/16W
R106	1-216-832-11	METAL, CHIP 8.2K 5% 1/16W
R107	1-216-836-11	METAL, CHIP 18K 5% 1/16W
R108	1-216-815-11	METAL, CHIP 330 5% 1/16W
R109	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R110	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R111	1-216-809-11	METAL, CHIP 100 5% 1/16W
R112	1-216-809-11	METAL, CHIP 100 5% 1/16W
R113	1-216-809-11	METAL, CHIP 100 5% 1/16W
R114	1-216-809-11	METAL, CHIP 100 5% 1/16W
R115	1-216-864-11	METAL, CHIP 0 5% 1/16W
R117	1-216-864-11	METAL, CHIP 0 5% 1/16W
R118	1-216-809-11	METAL, CHIP 100 5% 1/16W
R119	1-216-809-11	METAL, CHIP 100 5% 1/16W
R121	1-216-864-11	METAL, CHIP 0 5% 1/16W
R122	1-216-864-11	METAL, CHIP 0 5% 1/16W
R125	1-216-809-11	METAL, CHIP 100 5% 1/16W
R126	1-216-809-11	METAL, CHIP 100 5% 1/16W
R127	1-216-809-11	METAL, CHIP 100 5% 1/16W
R128	1-216-809-11	METAL, CHIP 100 5% 1/16W
R129	1-216-809-11	METAL, CHIP 100 5% 1/16W
R130	1-216-809-11	METAL, CHIP 100 5% 1/16W
R131	1-216-809-11	METAL, CHIP 100 5% 1/16W
R132	1-216-809-11	METAL, CHIP 100 5% 1/16W
R133	1-216-809-11	METAL, CHIP 100 5% 1/16W
R134	1-216-809-11	METAL, CHIP 100 5% 1/16W
R135	1-216-809-11	METAL, CHIP 100 5% 1/16W
R136	1-216-809-11	METAL, CHIP 100 5% 1/16W
R137	1-216-809-11	METAL, CHIP 100 5% 1/16W
R138	1-216-809-11	METAL, CHIP 100 5% 1/16W
R139	1-216-809-11	METAL, CHIP 100 5% 1/16W
R140	1-216-809-11	METAL, CHIP 100 5% 1/16W
R141	1-216-809-11	METAL, CHIP 100 5% 1/16W
R142	1-216-809-11	METAL, CHIP 100 5% 1/16W
R143	1-216-809-11	METAL, CHIP 100 5% 1/16W
R144	1-216-809-11	METAL, CHIP 100 5% 1/16W

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Ref. No. or Q'ty	Part No.	Description
R145	1-218-716-11	METAL 10K 0.50% 1/16W
R146	1-218-716-11	METAL 10K 0.50% 1/16W
R147	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R148	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R149	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R201	1-216-846-11	METAL, CHIP 120K 5% 1/16W
R202	1-216-842-11	METAL, CHIP 56K 5% 1/16W
R203	1-216-837-11	METAL, CHIP 22K 5% 1/16W
R204	1-216-809-11	METAL, CHIP 100 5% 1/16W
R205	1-216-843-11	METAL, CHIP 68K 5% 1/16W
R206	1-216-813-11	METAL, CHIP 220 5% 1/16W
R207	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R208	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R210	1-216-864-11	METAL, CHIP 0 5% 1/16W
R211	1-216-817-11	METAL, CHIP 470 5% 1/16W
R212	1-216-793-11	METAL 4.7 5% 1/16W
R213	1-216-793-11	METAL 4.7 5% 1/16W
R214	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R215	1-216-824-11	METAL, CHIP 1.8K 5% 1/16W
R216	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R217	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R218	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R219	1-216-834-11	METAL, CHIP 12K 5% 1/16W
R220	1-216-831-11	METAL, CHIP 6.8K 5% 1/16W
R221	1-216-797-11	METAL, CHIP 10 5% 1/16W
R222	1-216-797-11	METAL, CHIP 10 5% 1/16W
R223	1-216-797-11	METAL, CHIP 10 5% 1/16W
R224	1-216-797-11	METAL, CHIP 10 5% 1/16W
R225	1-216-816-11	METAL, CHIP 390 5% 1/16W
R226	1-216-816-11	METAL, CHIP 390 5% 1/16W
R227	1-216-864-11	METAL, CHIP 0 5% 1/16W
R228	1-216-809-11	METAL, CHIP 100 5% 1/16W
R229	1-216-809-11	METAL, CHIP 100 5% 1/16W
R230	1-216-857-11	METAL, CHIP 1M 5% 1/16W
R231	1-216-857-11	METAL, CHIP 1M 5% 1/16W
R300	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R301	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R302	1-216-815-11	METAL, CHIP 330 5% 1/16W
R303	1-216-815-11	METAL, CHIP 330 5% 1/16W
R304	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R305	1-216-808-11	METAL, CHIP 82 5% 1/16W
R306	1-216-847-11	METAL, CHIP 150K 5% 1/16W
R307	1-216-835-11	METAL, CHIP 15K 5% 1/16W
R308	1-216-837-11	METAL, CHIP 22K 5% 1/16W
R309	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R310	1-216-828-11	METAL, CHIP 3.9K 5% 1/16W
R311	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R312	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R313	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R314	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R315	1-216-815-11	METAL, CHIP 330 5% 1/16W
R316	1-216-837-11	METAL, CHIP 22K 5% 1/16W
R317	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R318	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R319	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R320	1-216-813-11	METAL, CHIP 220 5% 1/16W
R321	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R322	1-216-809-11	METAL, CHIP 100 5% 1/16W
R323	1-216-809-11	METAL, CHIP 100 5% 1/16W

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Ref. No. or Q'ty	Part No.	Description
R324	1-216-817-11	METAL, CHIP 470 5% 1/16W
R325	1-216-824-11	METAL, CHIP 1.8K 5% 1/16W
R326	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R327	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R328	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R329	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R330	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R331	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R332	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R333	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R334	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R335	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R336	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R337	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R338	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R339	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R340	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R342	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R343	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R344	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R345	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R346	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R347	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R348	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R349	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R350	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R351	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R352	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R353	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R354	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R355	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R356	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R357	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R358	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R359	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R360	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R361	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R362	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R363	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R364	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R365	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R366	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R367	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R368	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R369	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R370	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R371	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R372	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R373	1-216-295-91	METAL, CHIP 0 5% 1/10W
R374	1-216-295-91	METAL, CHIP 0 5% 1/10W
R375	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R376	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R377	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R378	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R379	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R380	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R381	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R382	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R383	1-216-833-11	METAL, CHIP 10K 5% 1/16W

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Ref. No. or Q'ty	Part No.	Description
R384	1-216-846-11	METAL, CHIP 120K 5% 1/16W
R385	1-216-847-11	METAL, CHIP 150K 5% 1/16W
R386	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R387	1-216-841-11	METAL, CHIP 47K 5% 1/16W
R388	1-216-838-11	METAL, CHIP 27K 5% 1/16W
R389	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R390	1-216-864-11	METAL, CHIP 0 5% 1/16W
R391	1-216-864-11	METAL, CHIP 0 5% 1/16W
R392	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R393	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R394	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R395	1-216-864-11	METAL, CHIP 0 5% 1/16W
R396	1-216-821-11	METAL, CHIP 1K 5% 1/16W
RV1	1-241-175-11	RES, ADJ, INDIVIDUAL METAL 220
RV2	1-238-090-11	RES, ADJ, 10K
RV201	1-241-092-11	RES, ADJ, INDIVIDUAL METAL 47K
RY1	1-515-614-11	RELAY
S301	1-572-999-11	SWITCH, SLIDE
S302	1-762-299-11	SWITCH, DIP (PIANO TYPE)
S303	1-572-999-11	SWITCH, SLIDE
X101	1-760-094-11	RESONATORVIBRATOR, CRYSTAL
X301	1-579-125-11	RESONATOR, CERAMIC

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UP-890MD (UC)
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